T.O. 2J–F100–53–10

TECHNICAL MANUAL

MAINTENANCE INSTRUCTIONS

DEPOT

AUGMENTOR DUCT AND NOZZLE MODULE

AIRCRAFT ENGINE
USAF MODEL
F100-PW-229

PRATT & WHITNEY
LARGE MILITARY ENGINES
UNITED TECHNOLOGIES CORPORATION
F33657-84-C-2014
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THIS PUBLICATION IS ONE OF A SET OF TWELVE MANUALS. THE COMPLETE SET CONSISTING OF T.O. 2J-F100-53-1 THROUGH T.O. 2J-F100-53-11 AND T.O. 2J-F100-11-2 IS REQUIRED FOR DEPOT MAINTENANCE.

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RECORD OF CHANGES

Change	Date
Original	15 Aug 91
Change 1	15 Nov 91
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Change 3	15 Aug 92
Change 4	15 Feb 93
Change 5	15 May 93
Change 6	15 Aug 93
Change 7	15 Nov 93
Change 8	15 Feb 94
Change 9	15 May 94
Change 10	15 Aug 94
Change 11	15 Nov 94
Change 12	15 Feb 95
Change 13	15 Aug 95
Change 14	15 Nov 95
Change 15	15 Feb 96
Change 16	15 May 96
Change 17	15 Aug 96
Change 18	15 Nov 96
Change 19	15 Feb 97
Change 20	15 May 97
Change 21	15 Aug 97
Change 22	15 Feb 98
Change 23	15 Aug 98
Change 24	15 Nov 98
Change 25	15 Feb 99
Change 26	15 May 99

TOTAL NUMBER OF PAGES IN THIS MANUAL IS 945

LIST OF EFFECTIVE FRONT MATTER PAGES

PAGE NO.	CHANGE NO.
Title	26
A - C	26
VS-1 Deleted	20
VS-2 Blank Deleted	20
a	26
b Blank	0
S-1 - S-2	14
S-3	12
S-4	14
S-5	12
S-6 Blank	12

NUMERICAL INDEX OF EFFECTIVE WORK PACKAGES

NOTE

Only those work packages (WP) and subordinate work packages (SWP) assigned to this manual are listed in this index.

Insert Change No. 26 work packages and subordinate work packages, dated 15 May 1999. Dispose of superseded work packages and subordinate work packages. If changed pages are issued to a work package or subordinate work package, insert the changed pages in the applicable work package or subordinate work package.

The portion of the text affected in a changed WP or SWP is indicated by change bars in the outer margin of each column of text. Changes to illustrations are indicated by pointing hands or change bars, as applicable. Changes to wiring diagrams are indicated by shaded areas.

WP/SWP Number	*CHANGE NO.
001 00	12
002 00	21
003 00	0
004 00	23
005 00	23
006 00 through 009 00	Open

NUMERICAL INDEX OF EFFECTIVE WORK PACKAGES (Continued)

WP/SWP Number	*CHANGE NO.
010 00	0
011 00	23
012 00 through 019 00	Open
020 00	0
021 00	11
022 00	0
023 00	17
024 00 through 199 00	Open
200 00	0
201 00	18
202 00	0
203 00 through 299 00	Open
300 00	9
301 00	2
302 00	9
303 00	26
304 00	Open
305 00	22
306 00	9
307 00	9
308 00 Revised	17
309 00	9
310 00	19
311 00	9
312 00	9
313 00	9
314 00	20
315 00	26
316 00	9
317 00	8
318 00	9
319 00	0
320 00	9
321 00	9
322 00	9
323 00	0
324 00	25
325 00	9
326 00	9
327 00	0
328 00	19
329 00	9
330 00	0
331 00	9
332 00	26
333 00	9
334 00	17
335 00 through 399 00	Open
400 00	19
401 00	0
402 00	0
403 00	21
404 00	Open
405 00	24
406 00	Open
407 00	19
408 00	18
409 00	9
410 00 New	19
411 00 through 412 00	Open
413 00	9
414 00	24
415 00	26
416 00	12
417 00	9
418 00 through 419 00	Open
420 00	0
421 00	9
422 00	0
423 00	Open
424 00	26
425 00	0
426 00 through 427 00	Open
428 00	26
429 00 through 432 00	Open
433 00	0
434 00 through 599 00	Open
600 00	0
601 00	21
602 00	16
603 00	21
604 00 through 699 00	Open
700 00	0
701 00	23
702 00	23

703 00	23	801 00	10
704 00 through 799 00	Open	802 00	10
800 00	0	803 00 and UP	Open

*Zero in this Column Indicates an Original WP/SWP

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

This is a list of TCTO’s applicable to this manual. TCTO’s will also be listed in the work packages to which they apply.

T.O. No.	Date	Level	Title (ECP No.)	WP/SWP
2J-F100(IV)-544	30 Aug 91	I	Installation of Redesigned Augmentor Combustion Chamber Assembly, F100-PW-229 Augmentor Module, F100-PW-229 Engines	701 00
2J-F100229-503	15 Oct 93	O/I	Modification of Pusher/Puller PWA 57535 For Compatibility With Parts Introduced Via ECP 91QA124 and ECP 91QA271 Performance Retention, F100-PW-229 Engines, F-15/F-16 Aircraft.	023 00

SAFETY SUMMARY

INTRODUCTION

This technical order (T.O.) describes physical and chemical processes which may require the use of chemicals, solvents, paints, or other commercially available hazardous material. This T.O. also describes maintenance actions which may require handling or use of potentially dangerous parts or equipment.

Personnel performing maintenance procedures and practices included in this T.O. shall be familiar with safety precautions and procedures associated with chemicals and other hazardous materials, parts and equipment. The user of this T.O. shall consult their local safety and health staff and Material Safety Data Sheet (MSDS) concerning any questions on hazardous chemicals, personal protective equipment requirements, and appropriate handling and emergency procedures. The user shall become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings, and cautions of the manufacturer/supplier for the safe use, handling, storage, and disposal of these materials. Disregarding safety precautions and procedures or performing unauthorized maintenance can cause engine or equipment damage, serious injury, illness, or death.

WARNING, CAUTION, and NOTE STATEMENTS

WARNING

Highlights an essential operating or maintenance procedure, practice, condition, or statement which, if not strictly observed, could result in personal injury, loss of human life, or an acute/chronic health hazard.

CAUTION

Highlights an essential operating or maintenance procedure, practice, condition, or statement which, if not strictly observed, could result in equipment damage or destruction.

WARNINGS (for personnel protection) or CAUTIONS (for equipment protection) precede selected procedures in this T.O. for additional emphasis. WARNINGS and CAUTIONS are used where emphasis beyond the general safety precautions and instructions are required because the equipment, procedures, or work environment represents an unusual situation (nonroutine use or application) to the technician. The WARNING or CAUTION applies each time the related step is repeated.

NOTES

A note describes an unusual procedure or condition which special attention must be paid for a particular reason.

Notes are not part of safety. A note does not replace a warning or caution.

SAFETY SUMMARY (continued)

BACKUP WRENCH

When torquing or breaking torque on any tube coupling nut, use a suitable wrench to apply torque to the fitting to which the part is attached. Failure to properly use a backup wrench can result in failure of tubes and accessories due to stress loading during torquing procedures.

BEARING HANDLING

The most common cause of bearing damage is attributed to improper preservation and mishandling. Do not handle bearings with bare hands. Wear approved gloves when handling bearings. Coat bearings with engine oil and store in labeled containers as matched sets. Ensure all bearing components have matching serial numbers before installation to prevent bearing failure due to mismatched contact surfaces.

BRAZING, SOLDERING AND WELDING

Brazing, soldering and welding operations may produce fumes that can be harmful to breathe. Arc welding emits ultraviolet light, which can burn the skin and eyes. Provide adequate ventilation. Wear protective clothing/equipment. Ensure gas bottles are properly secured.

CABLES, ELECTRICAL

Small radius bends or severe flexing of electrical cables can result in damage to conductors and/or outer braid.

CARBON SEALS AND SEAL SEATS

Carbon seals and carbon seal seats are easily damaged and shall be handled with care. Do not allow carbon seals to come in contact with petroleum based solvents. These solvents will reduce the lubricity of the carbons and result in rapid seal wear. Do not handle carbon seals or seal seats with bare hands. Wear approved, lint free gloves.

CHEMICAL COMPOUNDS AND SOLUTIONS

Many of the chemical compounds and solutions used in cleaning, inspection, and repair may cause irritation to the skin, eyes, and respiratory system. Many of the chemicals, including their vapors, may be poisonous, easily ignited, corrosive, and react violently with incompatible materials. Improper mixing and combining of these chemicals may produce violent reactions, rapid heat generation, and explosive/toxic gases. Heating certain chemicals may cause toxic gases to be produced. Observe manufacturer’s warning labels and Material Safety Data Sheet (MSDS) instructions for proper handling, storage, and disposal. Consult the local Safety Office for additional information.

COMPRESSED AIR

Compressed air can generate flying debris and can cause severe injury if air blast penetrates the skin or eyes. Reduce compressed air pressure for cleaning or drying to less than 30 psig. Use with effective chip guarding and personal protective equipment. Do not direct air blast toward other personnel.

SAFETY SUMMARY (continued)

COMPRESSED GASES

Many compressed gases are highly flammable/explosive and can cause suffocation at varied levels of concentration or exposure time. Some of the gases can freeze body tissue. Keep ignition sources away. Provide adequate ventilation. Wear protective clothing/equipment. Store in properly marked/labeled containers at approved locations. Do not use in confined areas which may create an explosive atmosphere. Refer to specific Material Safety Data Sheet (MSDS) for additional information.

DANGEROUS PRESSURE

Pressure system precautions apply to all equipment using gases and fluids at all ranges of pressure. To avoid injury, stand clear of tooling and parts being pressure tested when pressure is being applied. Proper tool installation, shielding and hose connections shall be ensured before applying pressure. Ensure all system components are compatible with pressures applied and pressure medium used. Pressure shall be applied slowly.

ELECTROSTATIC DISCHARGE (ESD)

Circuit card assemblies and their related components may be damaged by undetectable electrostatic discharge. Care shall be used during handling or repair of these items. Use electrostatic discharge precautionary standard operating procedures.

ENGINE AND ACCESSORIES - TEMPERATURE

Aircraft engines and accessories are extremely hot following operation. Allow sufficient time to cool or wear protective clothing/equipment when maintenance or inspection tasks are required following engine operation. Failure to comply may result in injury to personnel.

ENGINE AND CONTROLS PRESERVATION

Engines and engine controls shall be drained of all fuel and preserved before shipping. Failure to drain fuel can result in a fire hazard. Engine preservation replaces any fuel with oil, which acts as a corrosion preventing agent.

FOREIGN OBJECT DAMAGE (FOD)

Foreign objects can enter engine compartments and accessories during maintenance. Always be aware of the potential for foreign object damage (FOD) entering any uncovered opening of an engine or accessory. Always thoroughly clean parts and compartments to remove all foreign material. Make a final detail inspection of the work area when the job is finished. Follow standard operating procedures for tool and equipment accountability.

FOOD AND TOBACCO

Wash hands and face thoroughly prior to smoking tobacco products or eating food. Residue of the materials used in engine and equipment maintenance can cause serious health problems if ingested or inhaled in the smoke.

HEARING PROTECTION

The frequency and intensity of noise generated during some operations may cause an acute or chronic hearing impairment. Wear approved hearing protection equipment. Contact the local safety office or bioenvironmental engineering for further guidance.

SAFETY SUMMARY (continued)

HYDRAULIC TOOLING

Application of hydraulic pressure to tooling or engine parts can cause them to jump with enough force to cause personal injury. Excessive pressure applied to tooling by a hydraulic pump can cause a structural failure to the engine part and/or the tooling which could result in personal injury. Using a ram with a nonapproved part number or exceeding hydraulic pump pressure can result in excessive pressure being applied to tooling. Do not exceed ram capacity for a given tool. Stand clear of tooling and engine parts during hydraulic tool operations.

JEWELRY

Remove rings, watches, necklaces, and other metallic objects that may be snagged or cause shock or burn hazards.

LEAD SEALS

Lead seals shall only be removed when specifically called for in the procedure. Lead seals identify areas of critical adjustment that can only be attained at the Depot or Vendor level.

LIFTING, ROTATING, AND SUPPORTING

Personnel shall stay clear of objects being lifted during hoist operations or when objects are supported by temporary transition supports. To prevent personal injury, use adequate number of personnel and appropriately rated lifting/handling devices to lift or move objects. Unless specified in the procedures, personnel shall not work on objects suspended by a hoist or supported by temporary transition supports. Personnel shall be prepared for potential unbalanced conditions during hoist operations.

LIVE ELECTRICAL CIRCUITS

Do not work on electrical systems, replace components, or make adjustments to equipment with the electrical supply turned on. Under certain conditions, danger may exist even when the power control is in the "off" position due to charges retained by capacitors. To avoid injuries, always remove power from, discharge, and ground a circuit prior to servicing. Adhere to all lock-out/tag-out requirements.

MAINTENANCE STANDS AND FIXTURES

Ensure modules or assemblies are firmly secured to work stands or fixtures before performing maintenance procedures. Personal injury or damage to modules or assemblies may occur if a work stand or fixture slips.

METAL MACHINING PROCESSES

Metal machining processes may generate dust, fumes, filings, and/or shavings which may cause acute/chronic irritation to the skin, eyes, digestive tract, and respiratory system. Metallic dust vapors may form a fire hazard when exposed to heat, flame, or when in contact with oxidizing agents. Prior to performing any metal machining process, personnel shall consult their local safety and health staff and the Material Safety Data Sheet (MSDS) to become familiar with the hazards and protective measures for a specific metal.

SAFETY SUMMARY (continued)

MOVING ENGINE

Do not move an engine on work stand rails or transportation trailer without having installed proper supports, tie-rods, and flange adapters. Engine may shift or fall off rails and cause injury to personnel. When moving engine, do not push on engine. Use the engine support mount assemblies as a push point.

PACKING LUBRICATION (OIL AND FUEL SYSTEMS)

Use only the lubricant specified in the technical order to lubricate fuel and oil system packings. Use of an incompatible lubricant can cause oil foaming, clogging of critical fuel system filters, and packing deterioration leading to leakage, possible fire and engine shutdown.

PROTECTIVE CLOSURES AND COVERS

Install protective closures on all plumbing and components immediately upon removal. Install protective covers on engine modules, assemblies, parts, and compartments when not being worked.

QUICK RELEASE PINS

Do not force quick release pins into place as this may damage the self-locking feature of the pins. The compatibility of quick release pins is determined by the part number. Intermixing of pin part numbers during installation can result in loss of or failure of the quick release pins.

SHARP EDGED BLADES

Many blades have sharp edges. Wear protective gloves when handling bladed rotors and when installing or removing blades from rotors. Blades should only be used in their designed holder or rotor.

SUPER-CHILLED/HEATED PARTS AND EQUIPMENT

Super-chilled or heated parts and the equipment or agents used to heat or chill can cause burns, frostbite, or both. Wear temperature resistant gloves and other related protective clothing/equipment when handling chilled or heated parts or equipment. Super-chilled parts are fragile due to a lower resistance to impact. Heating parts beyond specified temperature limits can degrade heat treat qualities and result in part failure.

TEMPERATURE NORMALIZING

Allow heated or chilled parts to reach room temperature before applying final torque to fasteners. Failure to comply may result in improperly seated parts and/or mistorqued fasteners.

WORK BOLTS AND WORK NUTS

Work bolts and work nuts shall be permanently marked to distinguish them from engine bolts and nuts. Do not apply lubricants to work bolts and work nuts that will be replaced by engine bolts and nuts which require a thread sealant. Sealants will not adhere to threads contaminated with lubricants.

WORK PACKAGE

ALPHABETICAL INDEX

AUGMENTOR DUCT AND NOZZLE MODULE

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	12				
2 - 3	9				
4	7				
5	9				
6	12				
7	2				
8	9				

ALPHABETICAL INDEX

ALPHABETICAL INDEX (continued)

ALPHABETICAL INDEX (continued)

ALPHABETICAL INDEX (continued)

ALPHABETICAL INDEX (continued)

ALPHABETICAL INDEX (continued)

ALPHABETICAL INDEX (continued)

WORK PACKAGE

INTRODUCTION

AUGMENTOR DUCT AND NOZZLE MODULE

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 14

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	21	7	0	11	9
3	7	8 Blank	0	12 Blank	0
4	6	9	9	13	0
5	5	10 Blank	0	14 Blank	0
6	12				

1. INTRODUCTION.

a. This technical order contains depot maintenance instructions for augmentor duct and nozzle module.

2. CONTENTS, ARRANGEMENT, AND NUMBERING OF WORK PACKAGES.

a. This technical order contains work packages (WP) arranged in functional groups for disassembly, cleaning, inspection and repair, and assembly. A block of five digit numbers has been reserved for each group.

b. The first WP in a group is the introductory work package. This work package provides a listing of all work packages within the group by title and number.

c. The work package groups in this technical order are as follows:

WP Block Numbers	Functional Group
001 00	Alphabetical Index
002 00	Introduction
003 00 through 009 00	Module Removal/ Installation in Shipping Container
010 00 through 019 00	Module Disassembly
020 00 through 199 00	Disassembly of Subassemblies
200 00 through 299 00	Cleaning
300 00 through 399 00	Inspection
400 00 through 499 00	Repair
500 00 through 599 00	Open
600 00 through 699 00	Assembly of Subassemblies
700 00 through 799 00	Final Assembly
800 00 through 899 00	Table of Limits

3. CHANGE REQUESTS.

a. Recommendations for specific changes to this technical order (TO) shall be submitted on an AFTO Form 22 to SA-ALC/ LPCQ (TOMA), Kelly AFB, TX 78241-6421 in accordance with T.O. 00-5-1.

4. PICTORIAL INDEX.

a. The pictorial index is used to identify each work package and (See FO-1 and Table 1.) associated part requiring depot maintenance.

5. LEADING PARTICULARS.

a. The following is a list of leading particulars for the Augmentor Duct and Nozzle Module.

AUGMENTOR DUCT AND NOZZLE MODULE

Length:	91 inches
Diameter:	47 inches
Weight:	438 pounds (dry weight)

6. TYPICAL PART NUMBER.

a. When the word typical precedes a part number, that part number is one of several that may be used in that location. By refering to a typical part number in the Illustrated Parts Breakdown (IPB) manual (T.O. 2J-F100-54), all applicable part numbers can be found.

b. Instructions in this technical order for a typical part number also apply to the other (superseding) part numbers. When a part number is used without the word typical, it means that the procedure applies only to that part number.

7. LOCALLY MANUFACTURED SUPPORT EQUIPMENT.

a. Locally manufactured support equipment may be manufactured by using activity or by a supplier.

b. Locally manufactured support equipment is listed in the Master Numerical List of Support Equipment in T.O. 2J-F100-53-3 and the Applicable Support and Illustrated Support Equipment sections of maintenance WPs/SWPs.

c. Locally manufactured support equipment is identified in these WPs/SWPs by the prefix LM and a four digit number (LM 0123), or by the prefix LM followed by the PWA number (LM PWA 51203).

d. When an LM tool is identified in a maintenance WPs/SWPs, all data required to make the tool will be found in T.O. 2J-F100-53-3, WP 050 00.

Table 1. Augmentor Duct and Nozzle Module - Pictorial Index (See FO-1 and FO-2.)

INDEX NO.	NAME	REM	DISASSY	CLEAN	INSP	REPAIR	ASSY	INSTL	OTHER
	AUGMENTOR DUCT AND NOZZLE MODULE (SHIPPING CONTAINER)	T.O. 2J-F100-53-5, 101 00 004 00	011 00	200 00	300 00	400 00	701 00	T.O. 2J-F100-53-5, 727 00 005 00	800 00
1	LINER, AUGMENTOR COMBUSTION CHAMBER	011 00		201 00	303 00	403 00		701 00	
2	FINGER VALVE, AUGMENTOR	011 00		201 00	327 00			701 00	
3	DUCT, AUGMENTOR COMBUSTION CHAMBER	011 00		201 00				701 00	
4	AUGMENTOR NOZZLE ASSEMBLY	011 00	021 00	202 00			603 00	701 00	702 00 703 00
5	SHAFT, FLEXIBLE, SECONDARY ACTUATOR, CONVERGENT NOZZLE	011 00 @	@	@	301 00 @		@	701 00 @	
6	ACTUATOR, BALL SCREW, PRIMARY, CONVERGENT NOZZLE	011 00						701 00	
7	SEAT, HELICAL COMPRESSION SPRING	011 00		201 00				701 00	
8	ACTUATOR, BALL SCREW, SECONDARY, CONVERGENT NOZZLE	011 00						701 00	
9	BEARING, SELF-ALIGNING PLAIN, AUGMENTOR NOZZLE ACTUATOR SUPPORT	011 00		201 00	325 00			701 00	
10	SUPPORT (RIGHT), AUGMENTOR NOZZLE ACTUATOR	011 00		201 00	325 00	425 00		701 00	
11	SUPPORT (LEFT), AUGMENTOR NOZZLE ACTUATOR	011 00		201 00	325 00	425 00		701 00	
12	SEAL, AUGMENTOR DIVERGENT NOZZLE SEGMENT	021 00	022 00	201 00	305 00	405 00	602 00	703 00	
13	LINER, AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL	021 00		201 00	308 00			602 00	

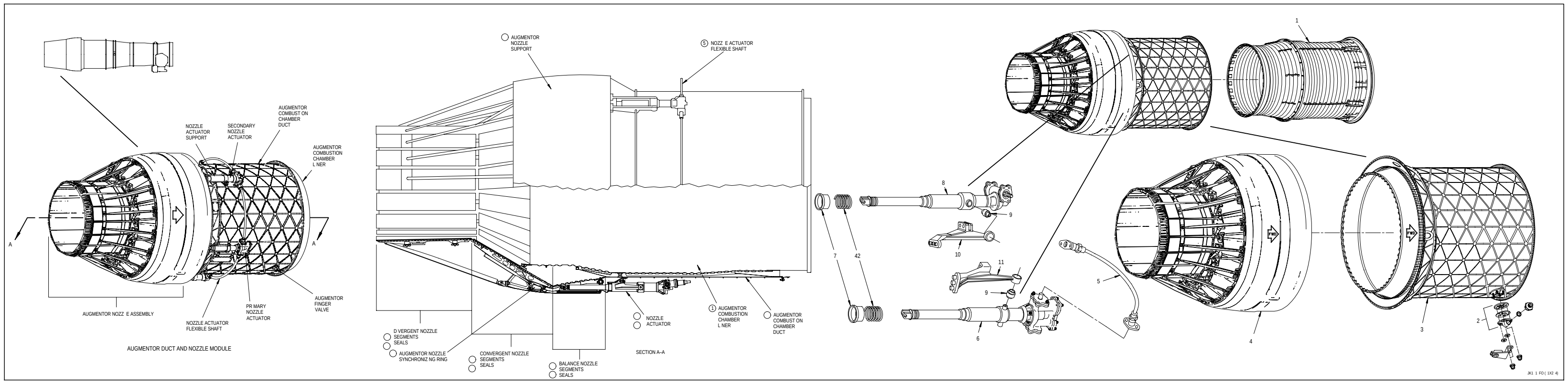
Table 1. Augmentor Duct and Nozzle Module - Pictorial Index (See FO-1 and FO-2.) (continued)

INDEX NO	NAME	REM	DISASSY	CLEAN	INSP	REPAIR	ASSY	INSTL	OTHER
14	SEAL, AUGMENTOR CONVERGENT NOZZLE SEGMENT	021 00	022 00	201 00	307 00	407 00	602 00	603 00	
15	SEAL, AUGMENTOR BALANCE NOZZLE SEGMENT	021 00	022 00	201 00	309 00	409 00	602 00	603 00	
16	CLAMP, BRIDGE, AUGMENTOR DIVERGENT NOZZLE SEAL	021 00		201 00	306 00			603 00	
17	LINER, AUGMENTOR CONVERGENT NOZZLE SEGMENT	022 00		201 00	313 00	413 00		603 00	
18	NOZZLE SEGMENT, DIVERGENT, AUGMENTOR	021 00		201 00	314 00	414 00	601 00	603 00	
19	NOZZLE SEGMENT, CONVERGENT, AUGMENTOR	021 00	023 00	201 00	310 00		601 00	603 00	
20	BEARING - SLEEVE		023 00	201 00	330 00		601 00		
21	PIN, AUGMENTOR CONVERGENT NOZZLE SEGMENT		023 00	201 00			601 00		
22	NOZZLE SEGMENT, BALANCE, AUGMENTOR	021 00		201 00	315 00	415 00	603 00	603 00	
23	CONNECTING LINK, RIGID, BALANCE NOZZLE SEGMENT	021 00		201 00	329 00		603 00	603 00 701 00	
24	BEARING, SPHERICAL, PLAIN, CONNECTING LINK, RIGID, BALANCE NOZZLE SEGMENT	021 00		201 00	316 00		603 00	701 00 603 00	
25	LEVER, AUGMENTOR NOZZLE	023 00	023 00	201 00	311 00		601 00	601 00	
26	BEARING, ANNULAR BALL, LEVER, AUGMENTOR NOZZLE	023 00		201 00	302 00	402 00		601 00	
27	CONNECTING LINK, RIGID, AUGMENTOR NOZZLE	023 00		201 00	312 00			601 00	
28	CONNECTING LINK, RIGID, AUGMENTOR DIVERGENT NOZZLE	021 00		201 00	320 00	420 0		603 00	
29	CONNECTING LINK, RIGID, AUGMENTOR NOZZLE	021 00		201 00	312 00			603 00	

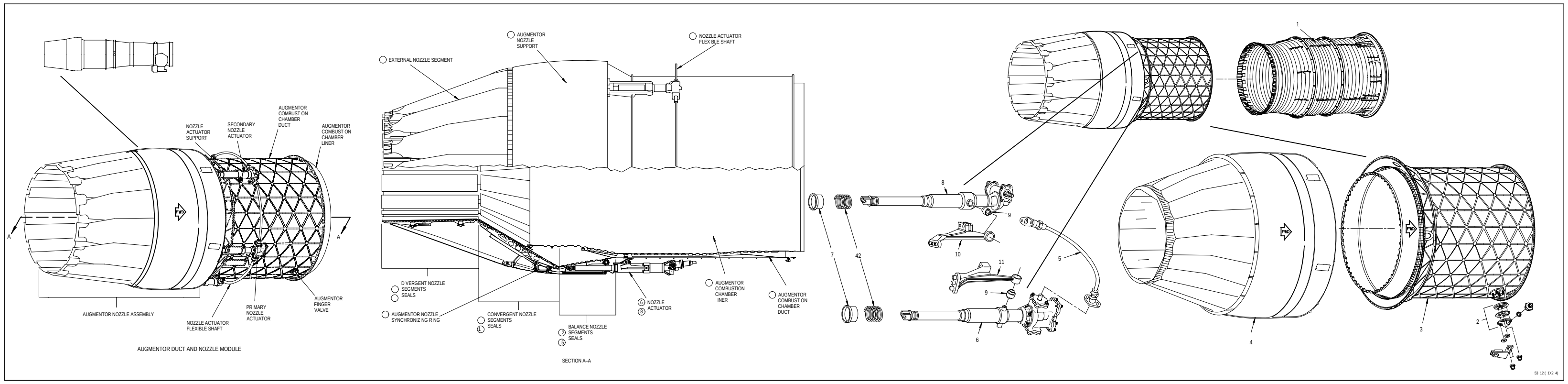
Table 1. Augmentor Duct and Nozzle Module - Pictorial Index (continued)

INDEX NO.	NAME	REM	DISASSY	CLEAN	INSP	REPAIR	ASSY	INSTL	OTHER
30	NOZZLE SEGMENT, AUGMENTOR EXTERNAL	021 00		201 00	332 00	416 00		701 00	
31	DELETED								
32	SUPPORT, AUGMENTOR NOZZLE		021 00	201 00			603 00		
33	CONNECTING LINK, AUGMENTOR NOZZLE SYNCHRONIZING RING	021 00		201 00	321 00	421 00		603 00	
34	BEARING, SELF-ALIGNING PLAIN, CONNECTING LINK, AUGMENTOR NOZZLE SYNCHRONIZING RING			201 00	321 00				
35	CAM FOLLOWER, ROLLER BEARING, AUGMENTOR NOZZLE	021 00		201 00	323 00			603 00	
36	RING, SYNCHRONIZING, AUGMENTOR NOZZLE	021 00		201 00	317 00	417 00		603 00	
37	RETAINER, AUGMENTOR NOZZLE PIN	021 00			319 00			603 00	
38	BRACKET, AUGMENTOR DIVERGENT CONNECTING LINK	021 00		201 00	318 00			603 00	
39	SEAL, AUGMENTOR NOZZLE SUPPORT	021 00		201 00	333 00	433 00		603 00	
40	SUPPORT (RIGHT), AUGMENTOR NOZZLE	021 00		201 00	322 00	422 00		603 00	
41	SUPPORT (LEFT), AUGMENTOR NOZZLE	021 00		201 00	322 00	422 00		603 00	
42	SPRING, HELICAL, ACTUATOR COMPRESSION	011 00		201 00				701 00	

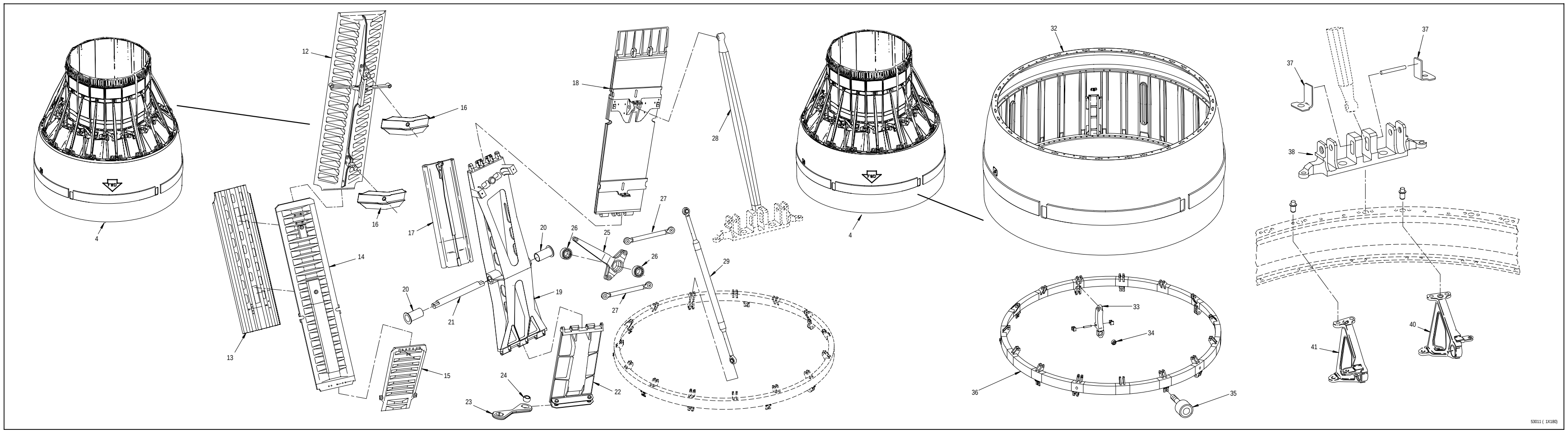
@REFER TO T.O. 2J-F100-53-4.



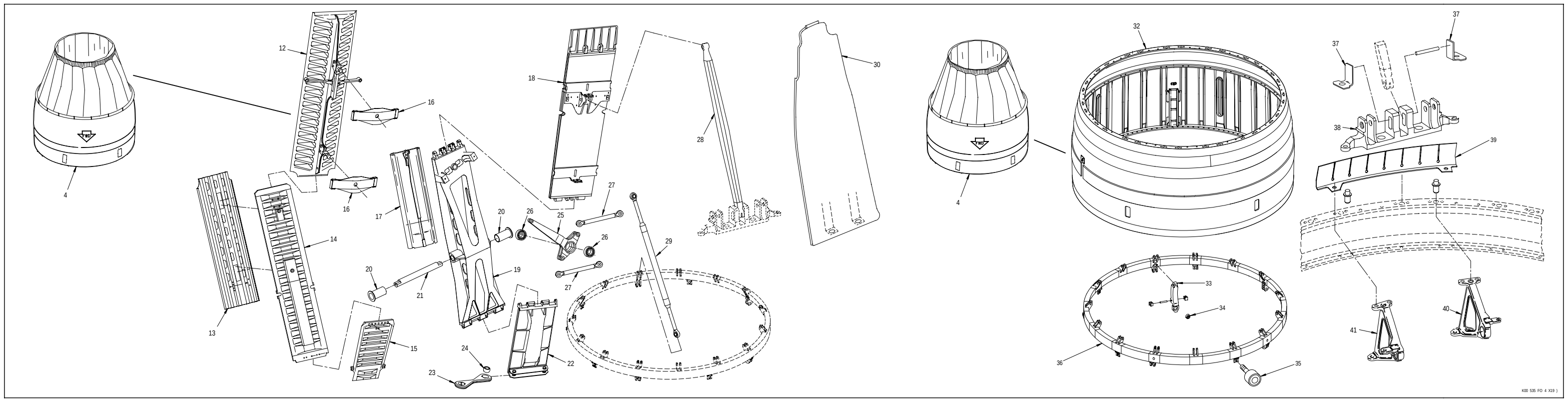
FO-1. Augmentor Duct and Nozzle Module Without External Nozzle Segments - Pictorial Index (Sheet 1 of 2)



FO-1. Augmentor Duct and Nozzle Module Without External Nozzle Segments - Pictorial Index (Sheet 2 of 2)



FO-2. Augmentor Duct and Nozzle Module With External Nozzle Segments - Pictorial Index (Sheet 1 of 2)



FO-2. Augmentor Duct and Nozzle Module With External Nozzle Segments - Pictorial Index (Sheet 2 of 2)

WORK PACKAGE

INTRODUCTION

SHIPPING CONTAINER, AUGMENTOR DUCT AND NOZZLE MODULE

EFFECTIVITY: ENGINE MODELS F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	0				

1. INTRODUCTION.

a. This work package introduces the 003 00 through 009 00 series work packages for the Augmentor Duct and Nozzle Module Shipping Container. The following work packages are included in this series.

WP No.	Title
004 00	Shipping Container, Metal, Augmentor Duct and Nozzle Module - Removal
005 00	Shipping Container, Metal, Augmentor Duct and Nozzle Module - Installation
006 00 through 009 00	Open

WORK PACKAGE

TECHNICAL PROCEDURES

SHIPPING CONTAINER, METAL, AUGMENTOR DUCT AND NOZZLE MODULE -

REMOVAL

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	23	4 - 5	23	7	12
3	0	6	0	8 Blank	0

REFERENCE MATERIAL REQUIRED

Title	Number
Engine Accessories and Rigging Procedures - - - - - - - - - -	T.O. 2J-F100-53-4
Detector, Augmentor Light-off - - - - - - - - - - - - - - - - - -	WP 046 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	AUGMENTOR DUCT AND NOZZLE MODULE - REMOVAL FROM SHIPPING CONTAINER	
	STAND, TRANSPORT/STORAGE/REPAIR - - - - - - - - - - - - -	PWA 22563
	ADAPTER, LIFT & HANDLING, AUGMENTOR MODULE - - - - - -	PWA 56718 OR
	RING, HANDLING -	PWA 52411
	ADAPTER, TRUNNION -	PWA 26147
	SLING -	PWA 37115
	ADAPTER -	PWA 51038
	SLING -	PWA 56336
	STAND, TRANSPORT/STORAGE/REPAIR - - - - - - - - - - - - -	PWA 56338

ILLUSTRATED SUPPORT EQUIPMENT

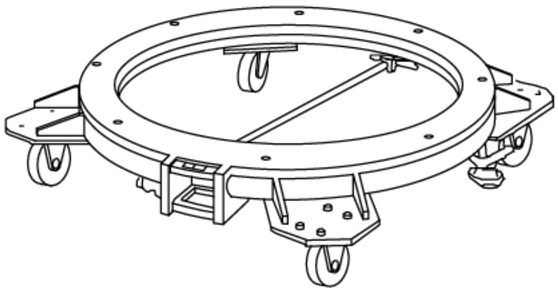

PWA 22563 –C

Figure T1. PWA 22563 Stand

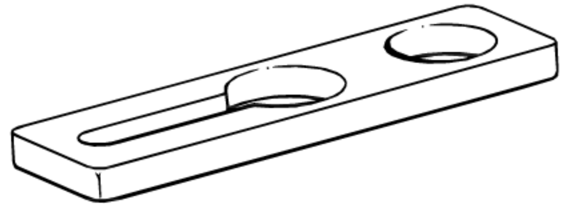

PWA 26147 –C

Figure T2. PWA 26147 Adapter

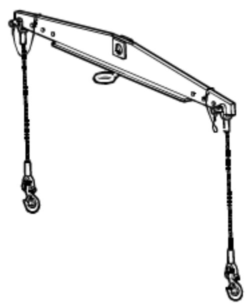

PWA37115–C

Figure T3. PWA 37115 Sling

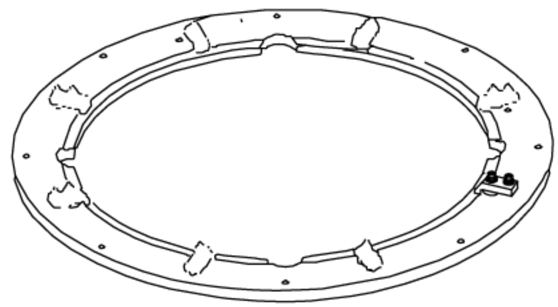

PWA 51038 –C

Figure T4. PWA 51038 Adapter

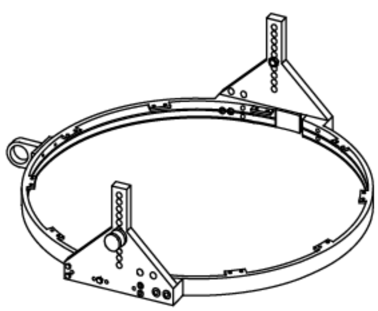

PWA 52411 –C

Figure T5. PWA 52411 Ring

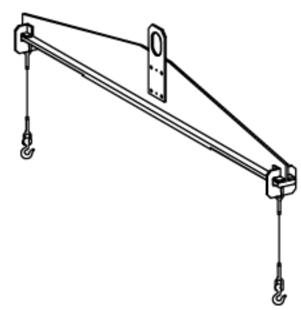

PWA 56336 –C

Figure T6. PWA 56336 Sling

ILLUSTRATED SUPPORT EQUIPMENT (continued)

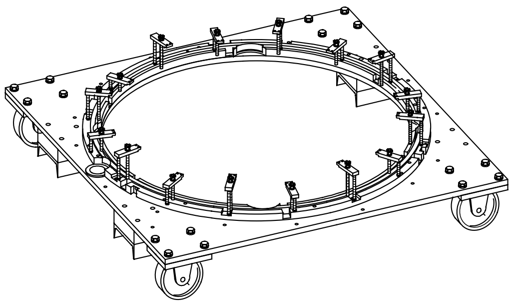


Figure T7. PWA 56338 STAND

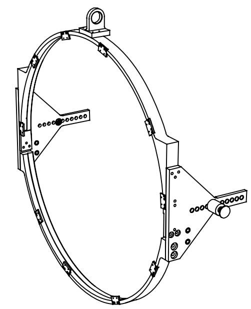


Figure T8. PWA 56718 ADAPTER

1. INTRODUCTION.

a. This work package contains instructions for removal of the augmentor duct and nozzle module from shipping container.

2. AUGMENTOR DUCT AND NOZZLE MODULE - REMOVAL FROM SHIPPING CONTAINER.

(See Figure 1.)

a. Release all pressure from container through pressure relief valve(10, figure 1). Remove all records and papers.

b. Loosen adjusting screws in shank end of each turnlock fastener(15) with 3/16 hex key, and release by turning 1/4 turn counterclockwise. Remove upper container half assembly(1). If upper container half assembly(1) is placed on floor, protect fasteners and sealing surface of container with blocks under flange.

NOTE

PWA 56718 adapter will be located at 12 o’clock position.

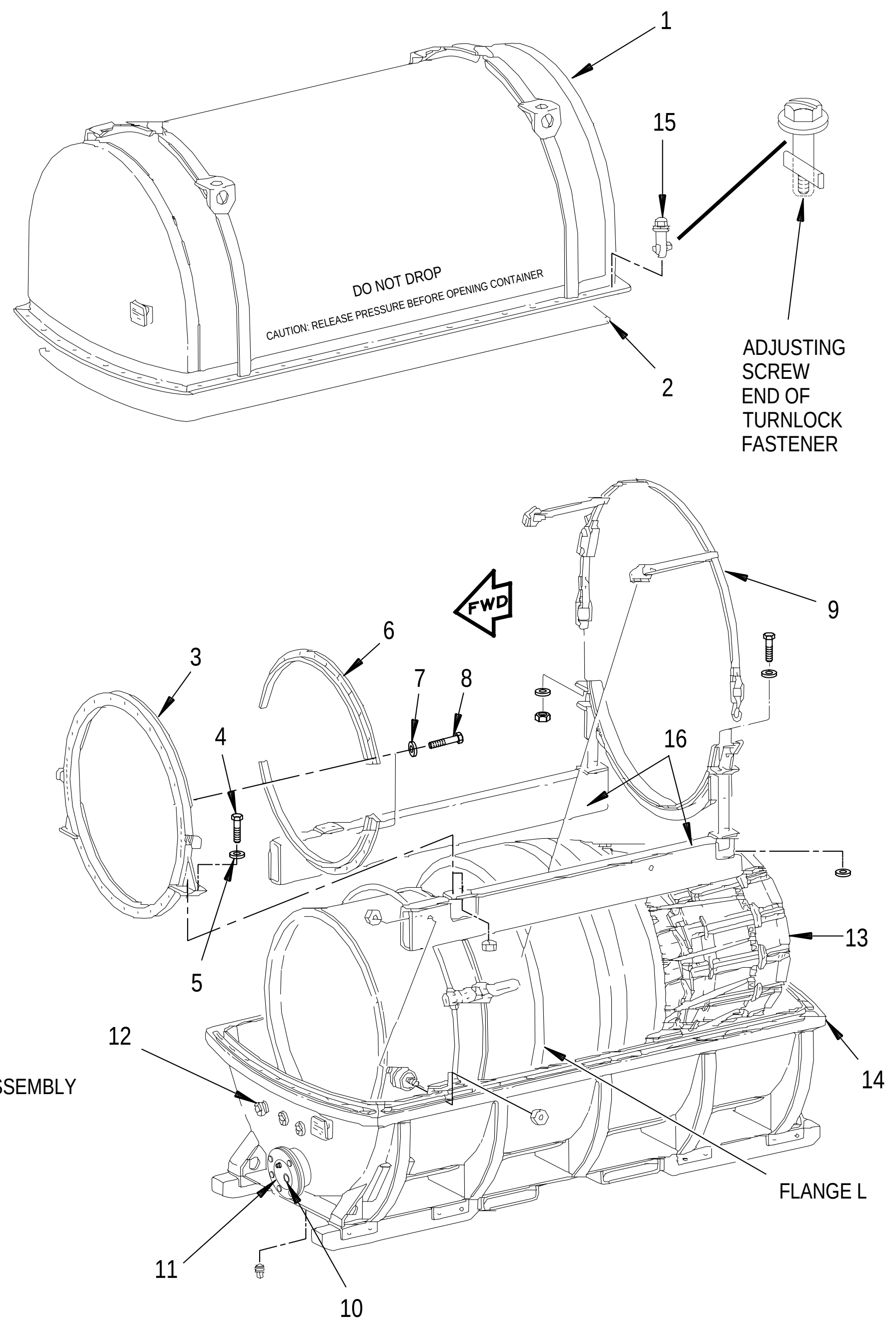
c. Install top half of PWA 56718 adapter to Flange L of augmentor duct and nozzle module at boltholes (viewed toward rear numbered counterclockwise) 87-88, 98-99, 110-111, 124-125, 6-7, 17-18, and 32-33.

d. Unlatch clamp on strap(9) and pivot it aside.

e. Remove bolts(4), lockwashers(5), and nuts securing front support(3) to rails(16).

f. Attach hoists, PWA 26147 adapters, and PWA 56336 slings to front support and PWA 56718 adapter.

g. Lift module horizontally from lower container half assembly(14), and while in a horizontal position, install bottom half of PWA 56718 adapter at Flange L boltholes (viewed toward rear numbered counterclockwise) 46-48, 58-59, 72-73, and 82-84.



1. UPPER CONTAINER HALF ASSEMBLY
2. PACKING
3. FRONT SUPPORT
4. BOLT
5. LOCKWASHER
6. POSITIONING PLATE
7. LOCKWASHER
8. CAP SCREW
9. STRAP
10. PRESSURE RELIEF VALVE
11. PLUG
12. HUMIDITY INDICATOR
13. AUGMENTOR DUCT AND NOZZLE MODULE
14. LOWER CONTAINER HALF ASSEMBLY
15. TURNLOCK FASTENER
16. RAIL

Figure 1. Augmentor Duct and Nozzle Module - Shipping Container

CAUTION

Module will become top-heavy when support is removed and may rotate within sling, striking storage container or floor if not manually restrained, resulting in parts damage.

NOTE

The front support(s) and positioning plates sandwich the front flange of the module.

h. Remove bolts(4), cap screws(8), and lockwashers(5 and 7) securing front support(3) and positioning plates(6). Manually restrain module(13) from rotating in sling. Remove plates(6) and support(3).

CAUTION

Do not use convergent nozzle secondary actuator flexible shafts, five places, as handholds. Shaft housings may become bent, resulting in internal flexible shaft chafing and shaft failure during engine operation.

NOTE

Shoulder side of PWA 56338 detail-33 locating ring faces up for installation of module onto stand.

i. Rotate module(13) to vertical position and install onto PWA 56338 storage stand. Use stand handle or actuator and supports as handholds. Remove hoist, sling, and ring as necessary.

j. Install light-off detector (LOD), if not previously installed, onto augmentor combustion chamber duct. Refer to T.O. 2J-F100-53-4, WP 046 00.

k. Assemble container details. Store container for future use.

l. Label container as being empty.

WORK PACKAGE

TECHNICAL PROCEDURES

SHIPPING CONTAINER, METAL, AUGMENTOR DUCT AND NOZZLE MODULE -

INSTALLATION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	23	6 - 7	23	8	0
4 - 5	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Engine Accessories and Rigging Procedures ----------	T.O. 2J-F100-53-4
Detector, Augmentor Light-off -----------------	WP 046 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

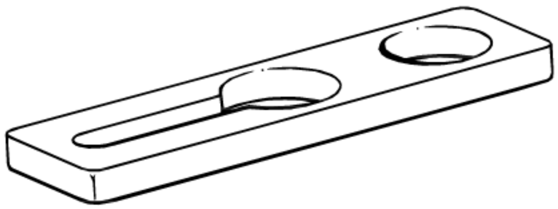
Nomenclature	Part Number	Quantity
Consumable packaging parts - augmentor module	P4021592	1
Adhesive, waterproof	* P48178	As Required
Cap, protective	* P4021568-02	1
Cover, augmentor	* P53362	1
Cover, shipping	* P4021567	1
Desiccant	* P8320	12
Envelope, instruction data	* P11466	1
Instructions, installation	* P4021577-01	2
Lacquer, spray	* P48164	As Required
Lockwire	* MS20995-C41	As Required
Plate, identification	* P52715	2
Seal, lead	* 83280	3
Tape, transparent	* P48076	As Required

* Details of PN P4021592

APPLICABLE SUPPORT EQUIPMENT

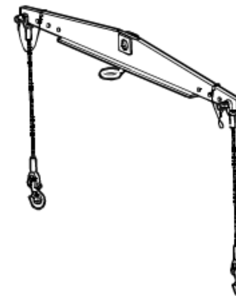
Paragraph	Function - Tool Nomenclature	Tool Number
2	AUGMENTOR DUCT AND NOZZLE MODULE - INSTALLATION INTO SHIPPING CONTAINER	
	AUGMENTOR DUCT AND NOZZLE MODULE, INSTALLATION INTO SHIPPING CONTAINER ---------------------	
	ADAPTER, LIFT & HANDLING, AUGMENTOR MODULE ------	PWA 56718 OR
	RING, HANDLING ------------------------	PWA 52411
	ADAPTER, TRUNNION ----------------------	PWA 26147
	SLING ------------------------------	PWA 37115
	SLING ------------------------------	PWA 56336

ILLUSTRATED SUPPORT EQUIPMENT



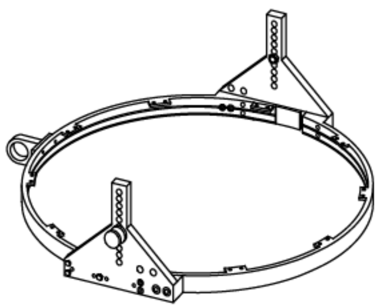
PWA 26147 –C

Figure T1. PWA 26147 ADAPTER



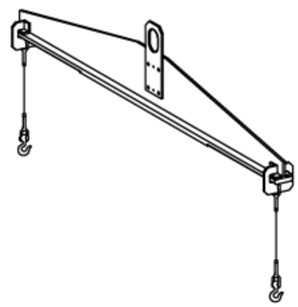
PWA37115–C

Figure T2. PWA 37115 SLING



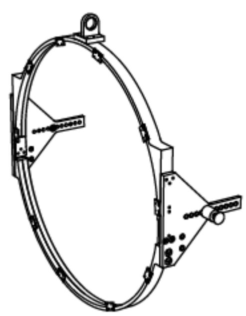
PWA 52411 –C

Figure T3. PWA 52411 RING



PWA 56336 –C

Figure T4. PWA 56336 SLING



PWA 56718 –C

Figure T5. PWA 56718 ADAPTER

1. INTRODUCTION.

a. This work package contains instructions for installation of the augmentor duct and nozzle module into shipping container.

2. AUGMENTOR DUCT AND NOZZLE MODULE - INSTALLATION INTO SHIPPING CONTAINER.

(See Figures 1 and 2.)

a. Prepare shipping container as follows:

(1) Remove old desiccant.

(2) Clean interior of container.

(3) Bond one set of PN P4021577-01 shipping container instructions to inner wall of lower container half assembly(14, figure 1) with PN P48178 waterproof adhesive. Protect bonded instructions by applying either of following overcoating or covering over instructions to a minimum of 0.500 inch beyond edge.

(a) Overcoating of PN P48164 spray lacquer or PN P48178 waterproof adhesive.

(b) Covering of PN P48076 transparent plastic film tape.

(4) Install and locate two PN P52715 identification plates onto container half assemblies(1 and 14) as follows:

(a) Left edge of plate 10.000 to 12.000 inches to right of rotor and stator container.

(b) Top edge of plate 0.500 to 1.000 inch below lower half container flange leg.

(c) Bottom edge of plate 0.500 to 1.000 inch above upper half container head to flange seam.

(5) Check packing(2) and mating surfaces for conditions which could cause leakage. Correct, if necessary.

b. Remove light-off detector (LOD), if not previously removed, from augmentor combustion chamber duct. Refer to T.O. 2J-F100-53-4, WP 046 00.

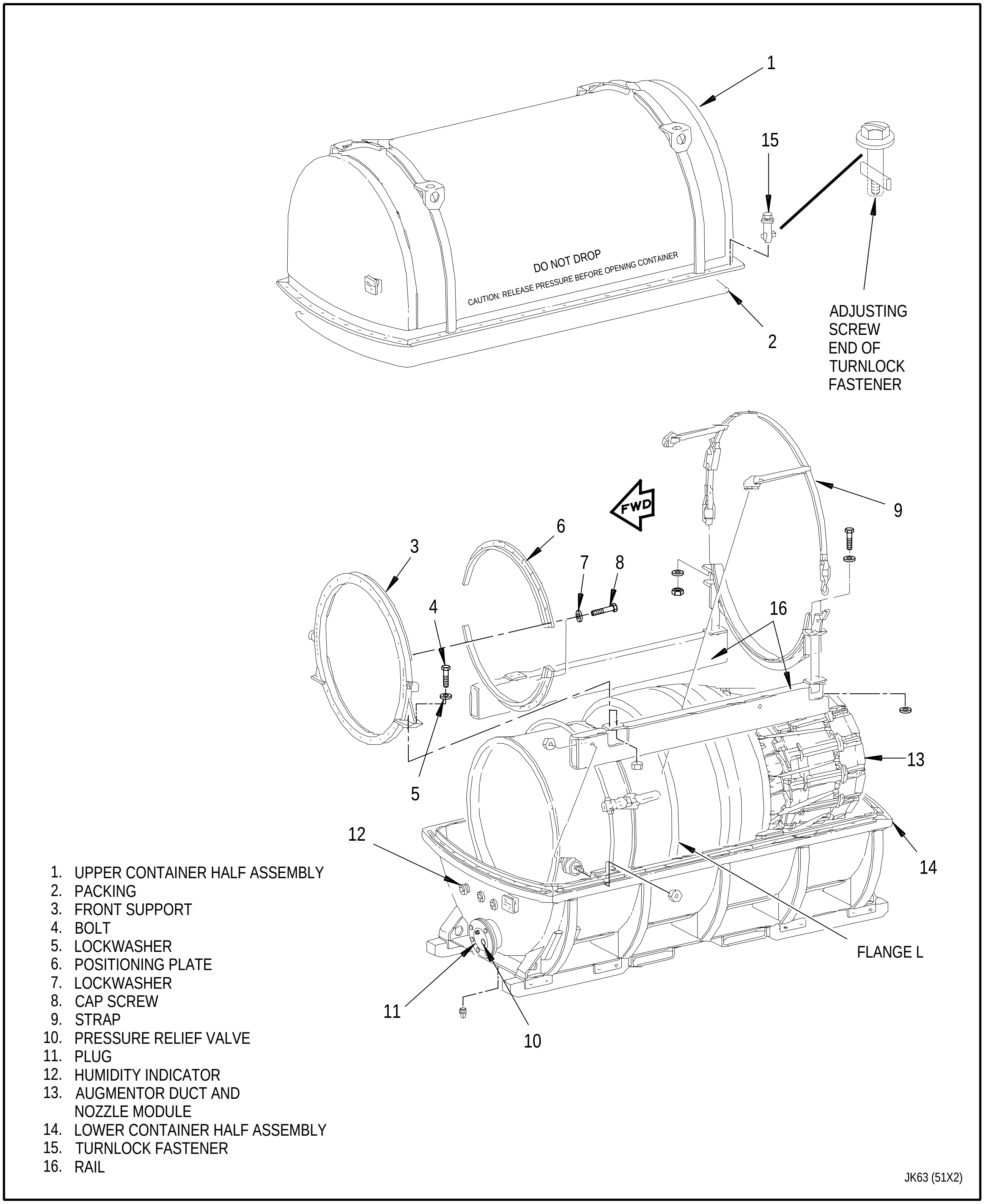


Figure 1. Augmentor Duct and Nozzle Module - Shipping Container

c. Install PWA 56718 adapter and rotate module as follows:

(1) Using augmentor finger valve (figure 2) as 6 o'clock reference point, attach top half of PWA 56718 adapter to nozzle support/augmentor duct mating flanges (Flange L) at boltholes (viewed toward rear numbered counterclockwise) 87-88, 98-99, 110-111, 124-125, 6-7, 17-18, and 32-33. Handling ring lifting eye will be at 12 o'clock position.

(2) Attach bottom half of handling ring at boltholes 46-48, 58-59, 72-73, and 82-84.

(3) Attach PWA 26147 adapters to PWA 56718 adapter.

(4) Using hoist and PWA 56336 sling, rotate augmentor module to front end down position.

d. Install front support(3, figure 1) as follows:

(1) Align 6 o'clock position of front support(3) with augmentor finger valve.

(2) Leaving liner to duct workbolts installed at 3 and 9 o'clock positions, remove remaining workbolts.

NOTE

Front support(3) and positioning plates(6) sandwich the front flange of the module.

(3) Secure front support(3) and positioning plates(6) with cap screws(8) and lockwashers(7).

e. Rotate augmentor module to horizontal position.

NOTE

Bottom half of handling ring not required when lifting module in horizontal position.

f. Remove bottom half of handling ring.

g. Set augmentor nozzle in closed position.

h. Install following covers and cap onto augmentor duct and nozzle module.

   (1) PN P53362 augmentor cover.

   (2) PN P4021567 shipping cover onto primary covergent nozzle actuator.

   (3) PN P4021568-02 protective cap onto augmentor finger valve cover.

i. Horizontally install augmentor duct and nozzle module into container with rear end supported by pivoted strap(9) and front support seated on rails.

j. Secure front mount support to rails with bolts(4), lockwashers(5), and nuts. Secure rear hold-down strap adjusting clamp latch, if necessary.

k. Remove PWA 56336 sling and PWA 56718 adapter.

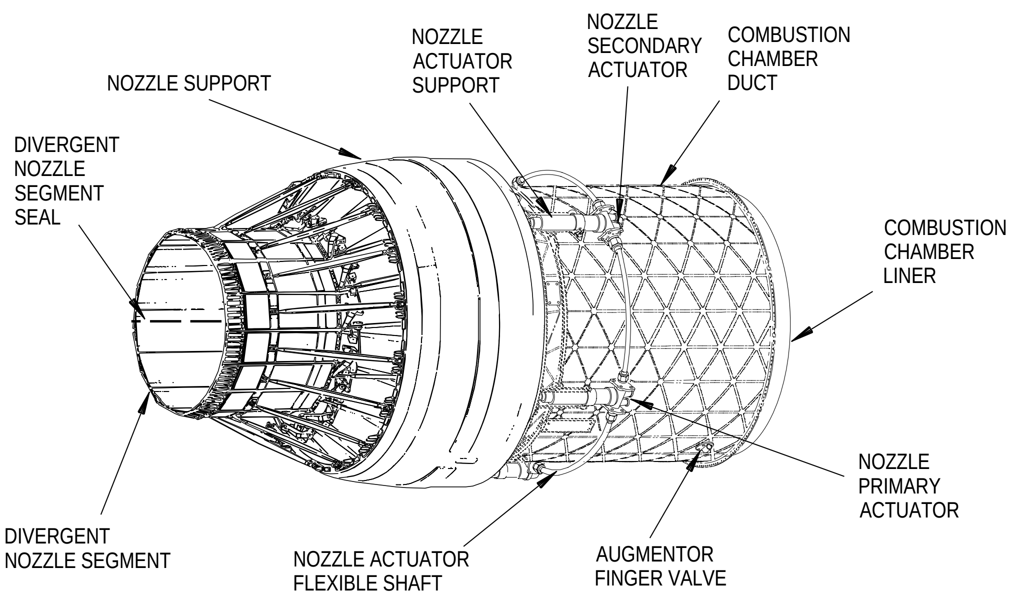


Figure 2. Augmentor Duct and Nozzle Module - Identification of Parts

l. Attach condition tag to augmentor module.

CAUTION

Concentration of heat in one area will damage humidity indicator.

NOTE

Humidity indicator can be repaired using heat.

m. Replace humidity indicator(12) or reuse by drying with hand-held dryer until blue color is restored.

n. Place 12 bags of PN P8320 desiccant in basket in container.

o. Inspect ID for cleanness and augmentor for security.

p. Tighten adjusting screws in shank end of each turnlock fastener(15) with 3/16 hex key in a sequence which skips from quadrant to quadrant in order to uniformly compress packing(2).

q. Install upper container half assembly(1) and secure by turning turnlock fasteners(15) 1/4 turn clockwise. Torque adjusting screws in shank end of fasteners 100 to 150 pound-inches.

r. Place all shipping paperwork, including PN P4021577-01 shipping container instructions, in PN P11466 instructions envelope. Place envelope in record receptacle. Secure record receptacle with PN MS20995-C41 lockwire and two PN 83280 lead seals.

NOTE

Sealed container may be shipped with no internal pressure.

s. Install and seal rotor and stator container cover with PN MS20995-C41 lockwire and one PN 83280 lead seal.

t. Whenever container marking is required, identify module on outside of container in one-half to one inch high block letters, depending on container size.

WORK PACKAGE

INTRODUCTION

AUGMENTOR DUCT AND NOZZLE MODULE -

DISASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	0				

1. INTRODUCTION.

This work package introduces disassembly series work packages for the Augmentor Duct and Nozzle Module. Work package numbers 010 00 through 019 00 are reserved for this series.

WP No.	Title
011 00	Augmentor Duct and Nozzle Module - Disassembly
012 00 through 019 00	Open

WORK PACKAGE

TECHNICAL PROCEDURES

AUGMENTOR DUCT AND NOZZLE MODULE -

DISASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 12

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	23	5	0	8 - 10	0
3	16	6	12	11	17
4	23	7	23	12 Blank	17

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

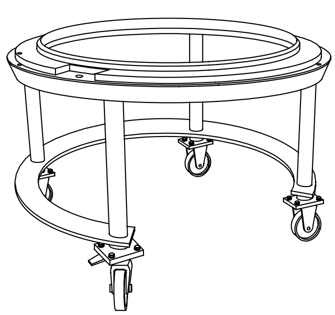
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

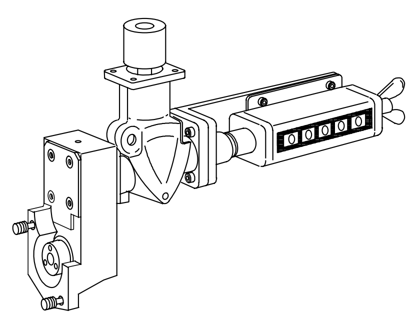
Paragraph	Function - Tool Nomenclature	Tool Number
3	AUGMENTOR COMBUSTION CHAMBER LINER - REMOVAL	
	TORQUE ADAPTER, PRIMARY CONVERGENT NOZZLE BALLSCREW ACTUATOR, TURN AND COUNT	PWA 51757 OR
	ADAPTER, AUGMENTOR NOZZLE ACTUATOR DRIVE	PWA 56639
	SLING, AUGMENTOR NOZZLE LIFTING	PWA 52644
	ADAPTER, LIFTING, AUGMENTOR NOZZLE FRONT FLANGE, VERTICAL ONLY	PWA 52679
	STAND, INLET/FAN MODULE, STORAGE AND DISASSEMBLY	PWA 56338
4	AUGMENTOR NOZZLE ASSEMBLY - REMOVAL	
	TORQUE ADAPTER, PRIMARY CONVERGENT NOZZLE BALLSCREW ACTUATOR, TURN AND COUNT	PWA 51757 OR
	ADAPTER, AUGMENTOR NOZZLE ACTUATOR DRIVE	PWA 56639
	SUPPORT, BUILD STAND, AUGMENTOR NOZZLE FRONT FLANGE	PWA 55460
	STAND, AUGMENTOR DUCT AND NOZZLE MODULE BUILD	PWA 51120

ILLUSTRATED SUPPORT EQUIPMENT



PWA 51120 –C

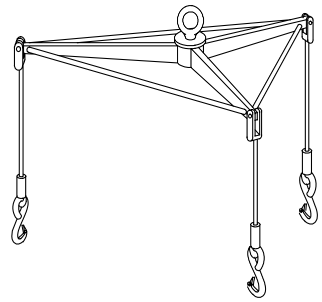
Figure T1. PWA 51120 STAND



PWA 51757 –C

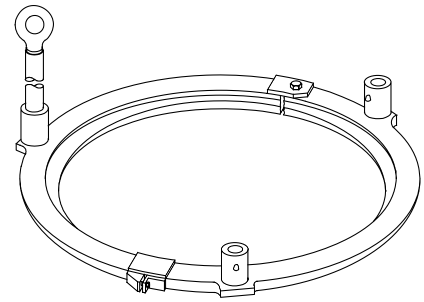
Figure T2. PWA 51757 TORQUE ADAPTER

ILLUSTRATED SUPPORT EQUIPMENT (continued)



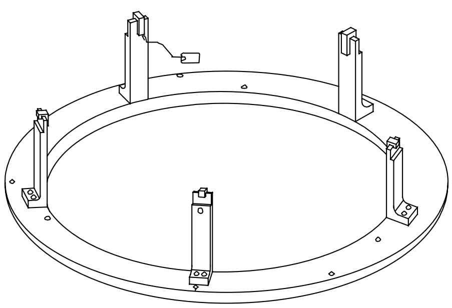
PWA 52644 –C

Figure T3. PWA 52644 SLING



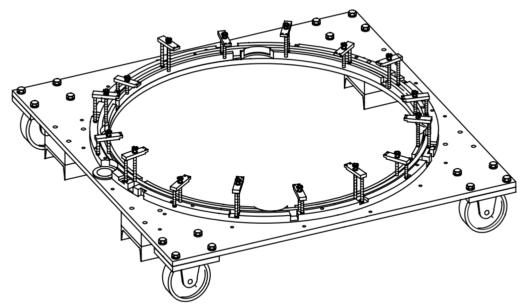
PWA 52679 –C

Figure T4. PWA 52679 ADAPTER



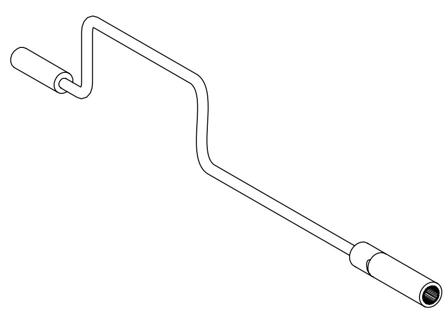
PWA 55460 –C

Figure T5. PWA 55460 SUPPORT



PWA 56338 –C

Figure T6. PWA 56338 STAND



PWA 56639 –C

Figure T7. PWA 56639 ADAPTER

1. INTRODUCTION.

a. This work package contains instructions for disassembly of the augmentor duct and nozzle module.

2. PRELIMINARY INSTRUCTIONS.

a. Remove augmentor duct and nozzle module from engine. Refer to T.O. 2J-F100-53-5, WP 226 00.

3. AUGMENTOR COMBUSTION CHAMBER LINER - REMOVAL.
(See Figure 1.)

CAUTION

Augmentor nozzle assembly must be fully closed before removing liner to prevent damage to nozzle assembly.

a. Ensure nozzle assembly is closed. If necessary, close nozzle assembly by using PWA 51757 torque adapter and speed handle or PWA 56639 adapter. Engage wrench into left-hand drive connector of primary actuator(3, figure 1) and turn clockwise.

b. Using hoist, attach PWA 52644 sling to PWA 52679 lifting adapter.

c. Secure PWA 52679 lifting adapter to augmentor duct and nozzle assembly as follows:

(1) Position adapter and sling over nozzle support(1).

(2) Open adapter so that it sufficiently clears OD of nozzle support.

(3) Lower adapter onto front flange of nozzle support (Flange L). Ensure that front flange of nozzle support sits on step of adapter.

(4) Do not allow augmentor combustion chamber duct(4) to support weight of nozzle assembly and PWA 52679 lifting adapter. Always support weight with PWA 52644 sling and hoist.

(5) Secure adapter using detail-10 swing bolt(2).

d. Remove augmentor duct and nozzle assembly from PWA 56338 stand and position over several wooden blocks placed on floor.

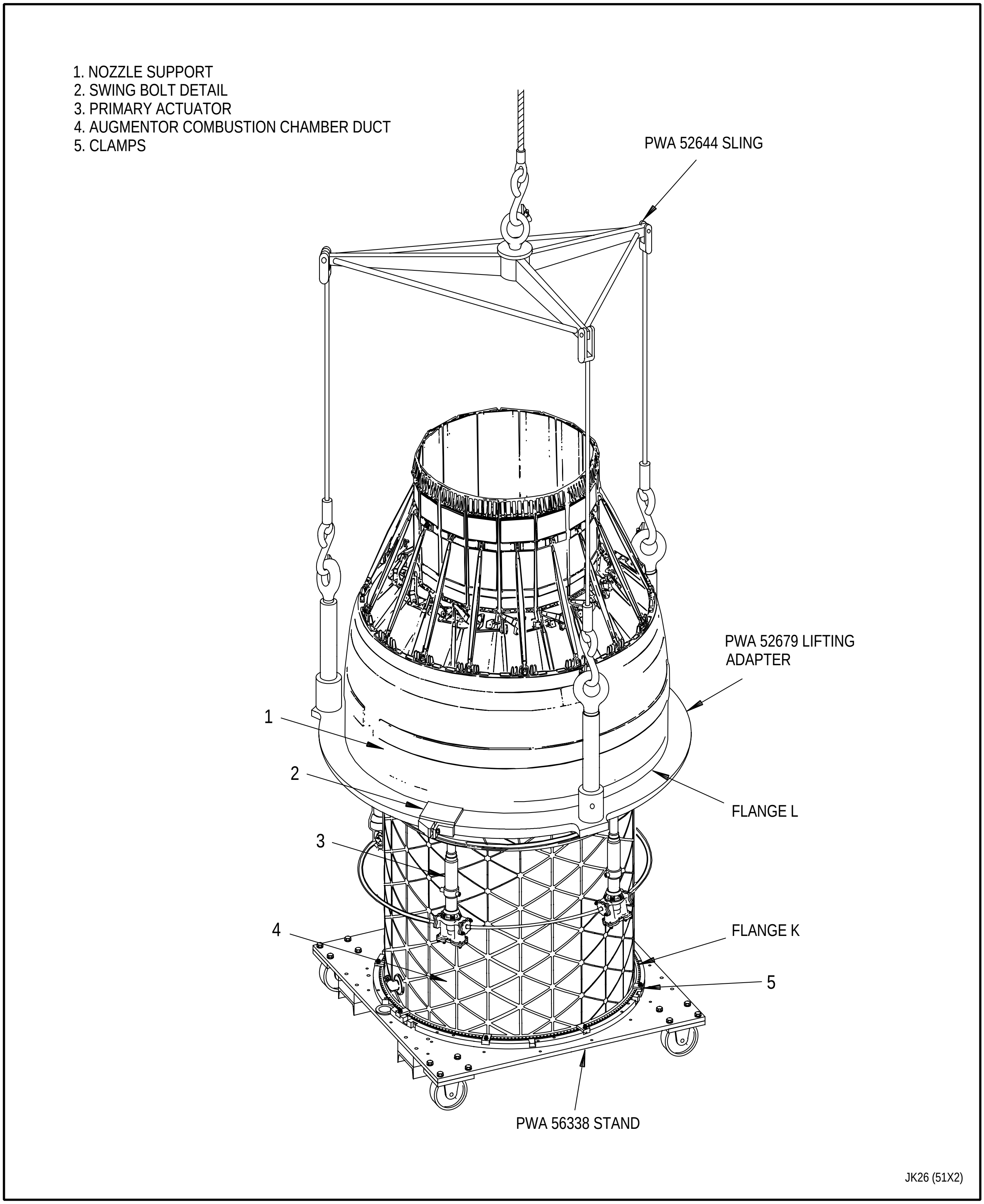


Figure 1. Augmentor Duct and Nozzle Module - Disassembly Tooling

e. Lower augmentor duct and nozzle assembly until augmentor combustion chamber liner almost touches wooden blocks.

f. Remove workbolts or lockwire from Flange K and let combustion chamber liner slide out onto wooden blocks.

g. Raise augmentor duct and nozzle assembly upward and away from combustion chamber liner.

NOTE

Shoulder side of PWA 56338 detail-33 locating ring faces up for installation of augmentor and duct assembly onto stand.

h. Install augmentor duct and nozzle assembly on PWA 56338 stand. Secure with clamps(5).

i. Remove PWA 52679 lifting adapter and PWA 52644 sling.

4. AUGMENTOR NOZZLE ASSEMBLY - REMOVAL.

(See Figures 2, 3, and 4.)

a. Remove screws(1, figure 2) and access covers(2).

b. Bend tabs of key washers(4) open and rotate head of pins(3). Remove pins and key washers. Discard key washers.

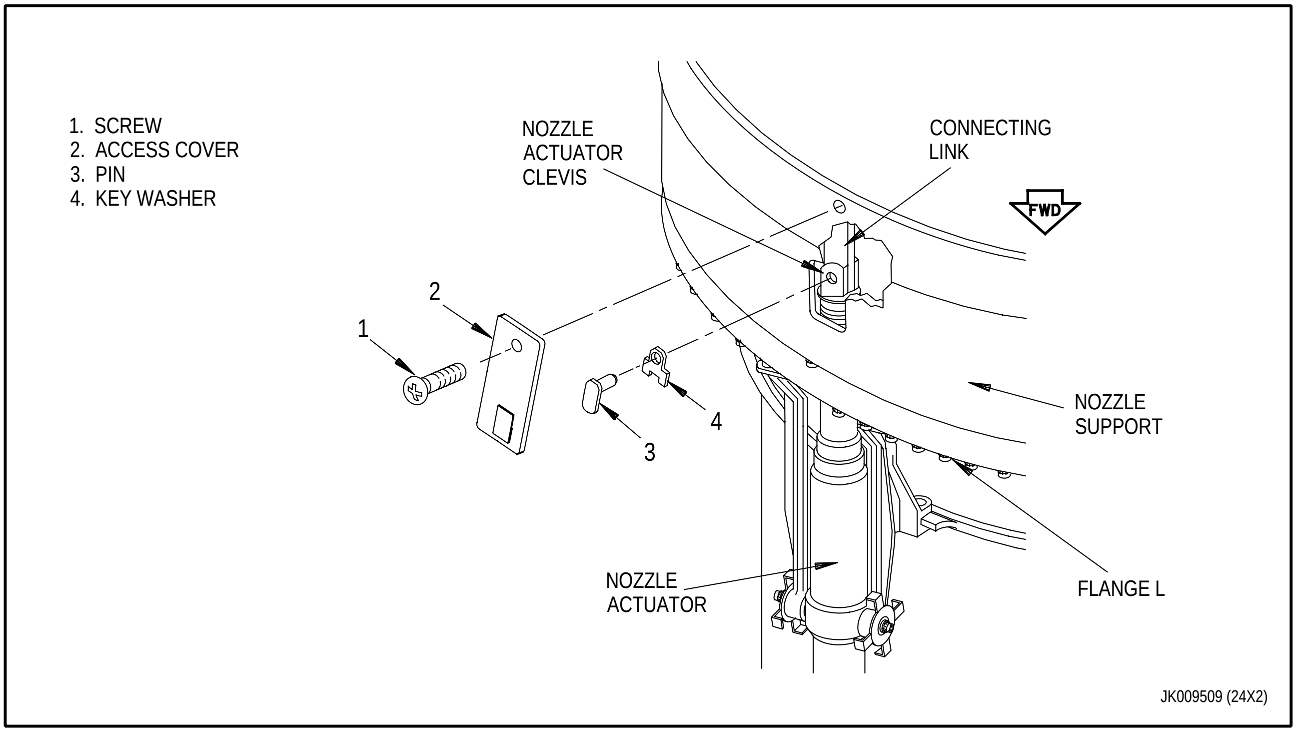


Figure 2. Convergent Nozzle Actuator Attachment - Removal

c. If necessary engage PWA 51757 torque adapter and speed handle or PWA 56639 adapter into left-hand drive connector of primary nozzle actuator.

CAUTION

Actuators can be damaged if excessive torque is applied after travel reaches full stop.

d. Retract actuators to full retracted stop and remove wrench.

e. Remove remaining bolts and ground handling strut brackets securing augmentor combustion chamber duct to augmentor nozzle assembly.

f. Install PWA 55460 build stand supports(3, figure 4) onto PWA 51120 build stand(5). Secure using detail-4 screw assemblies(4).

g. Manually actuate nozzle to full open position.

h. Lift nozzle assembly away from augmentor duct and position over build stand and support.

i. If necessary, loosen PWA 55460 detail-6 clamps(8) in order to prevent interference with nozzle assembly.

j. Align nozzle access holes with PWA 55460 support(3).

k. Lower nozzle assembly onto build stand and support.

l. Ensure that front flange of nozzle assembly sits on step of PWA 55460 support.

m. Close nozzle.

n. Secure nozzle assembly to support using detail-6 clamps(8).

o. Remove tooling.

5. CONVERGENT NOZZLE BALL SCREW ACTUATORS - REMOVAL.
(See figure 3.)

a. Remove convergent nozzle secondary actuator flexible shafts(16, figure 3) as follows:

b. Hold hex on bushing and loosen jamnuts(14) on each end of shaft. Slide jamnuts back over shafts.

c. Remove bolts(15) securing tube adapters(13) to actuators(3 and 11).

d. Slide back tube adapters. Remove cotter pin(12) at splined end of flexible shaft. Discard cotter pin and slide back splined sleeve.

CAUTION

Excessive force during separation can result in bent shaft housing. A slightly bent shaft housing can cause shaft failure during engine operation.

e. Remove flexible shafts(16). Avoid use of excessive force when separating flexible shafts from actuators.

NOTE

Marking actuator locations will eliminate necessity to resize nozzle assembly when only replacing augmentor combustion chamber duct.

f. Mark actuator locations on nozzle support.

g. Remove bolts(9) and nuts(8) securing actuator supports(5 and 10) to mounting flange on duct.

h. Remove bolts(4) securing actuator supports to Flange L. Remove actuator supports and actuators from duct.

i. Remove spring(2) and seat(1) from each actuator.

j. Remove bolts(6) and key washers(7) to separate actuators from actuator supports.

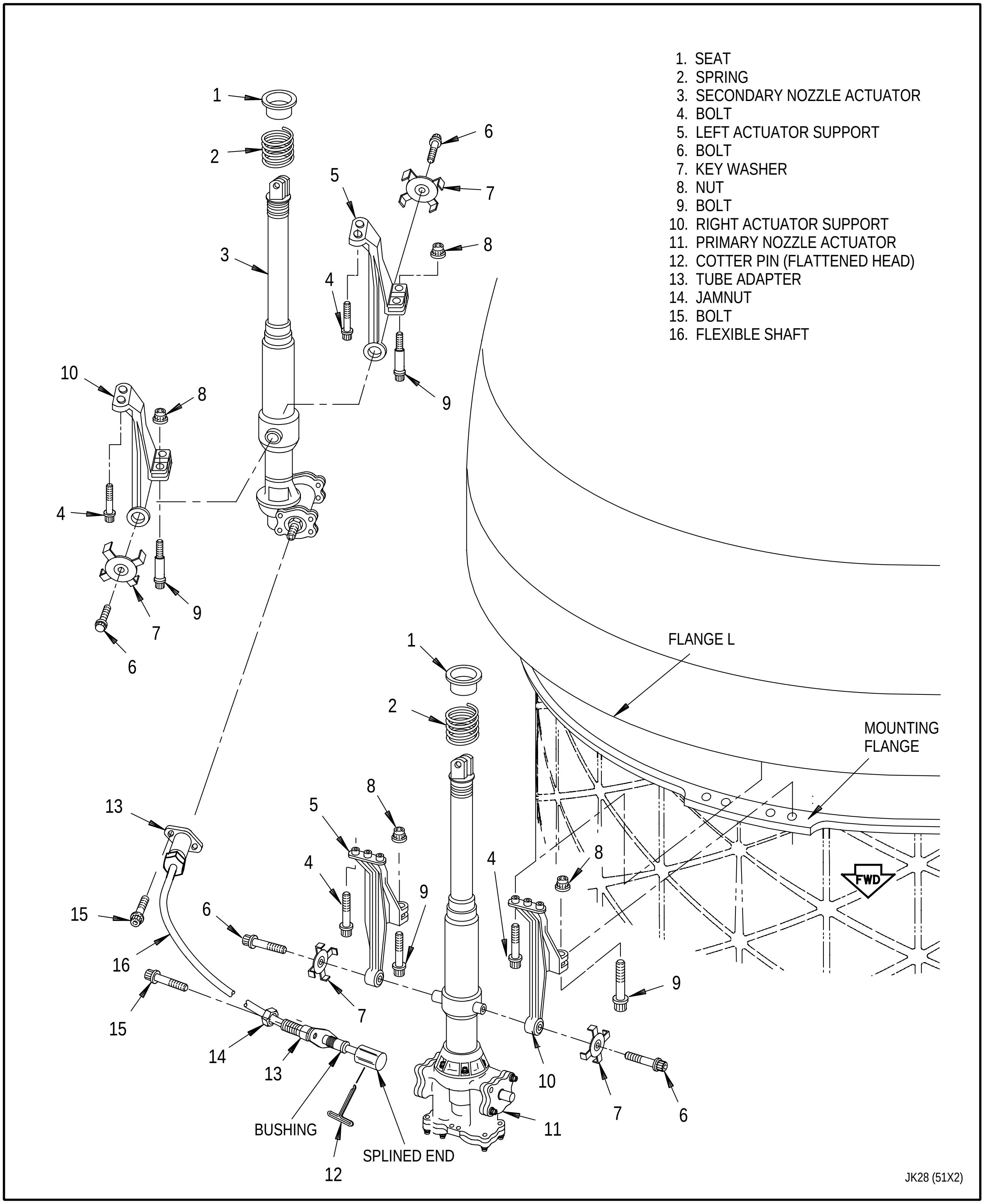


Figure 3. Convergent Nozzle Actuators - Removal

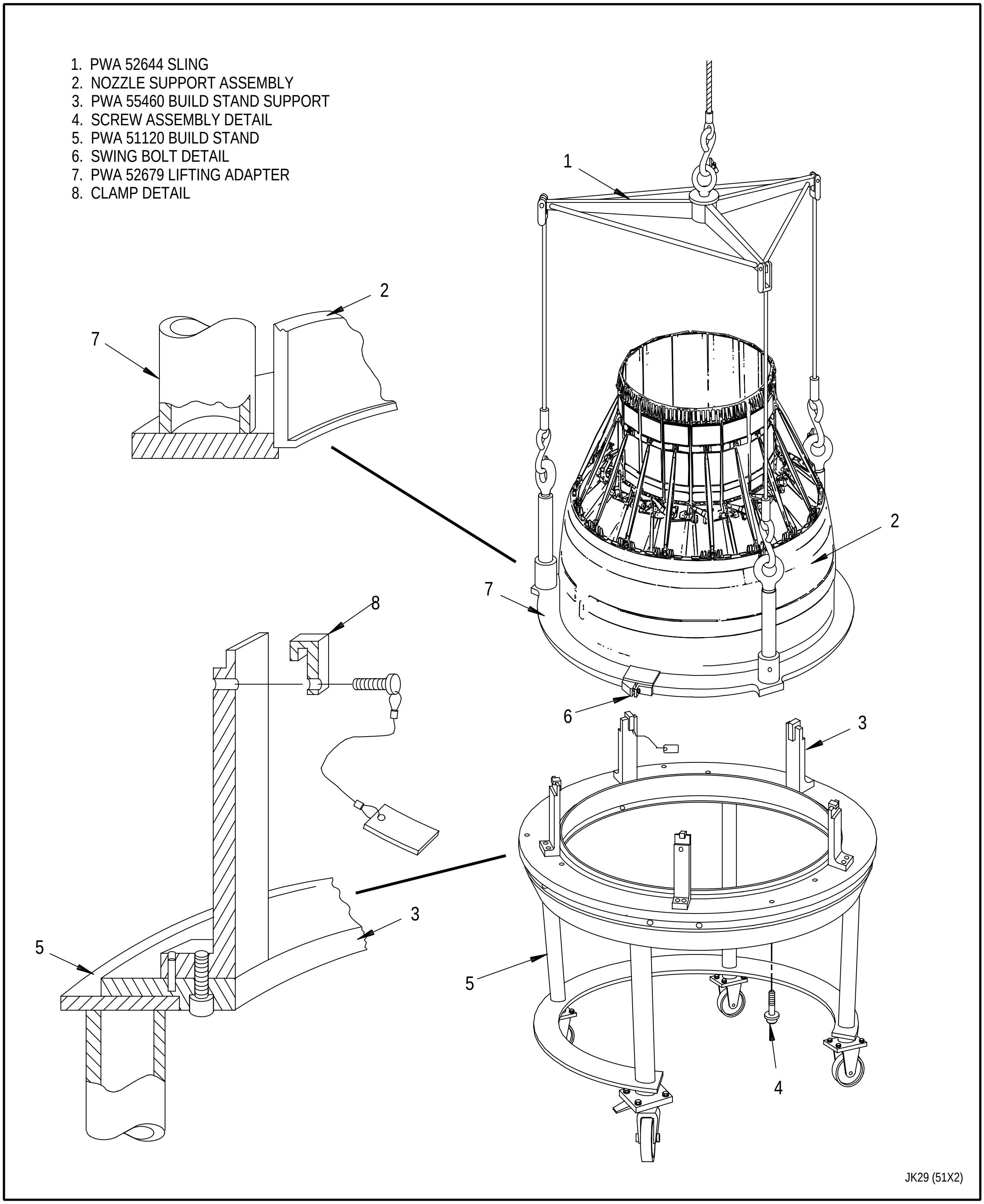


Figure 4. Augmentor Nozzle Assembly - Installation Into Build Stand

6. AUGMENTOR FINGER VALVE ASSEMBLY - REMOVAL AND DISASSEMBLY.
(See Figure 5.)

a. Remove adapter(10) and gasket(9). Discard gasket.

b. Remove nuts(2 and 11, figure 5), bracket(3), spacers(4) and finger valve assembly from augmentor combustion chamber duct(1).

c. Remove screws(8) securing finger valve cover(5), spring(6), and spacer(7) together.

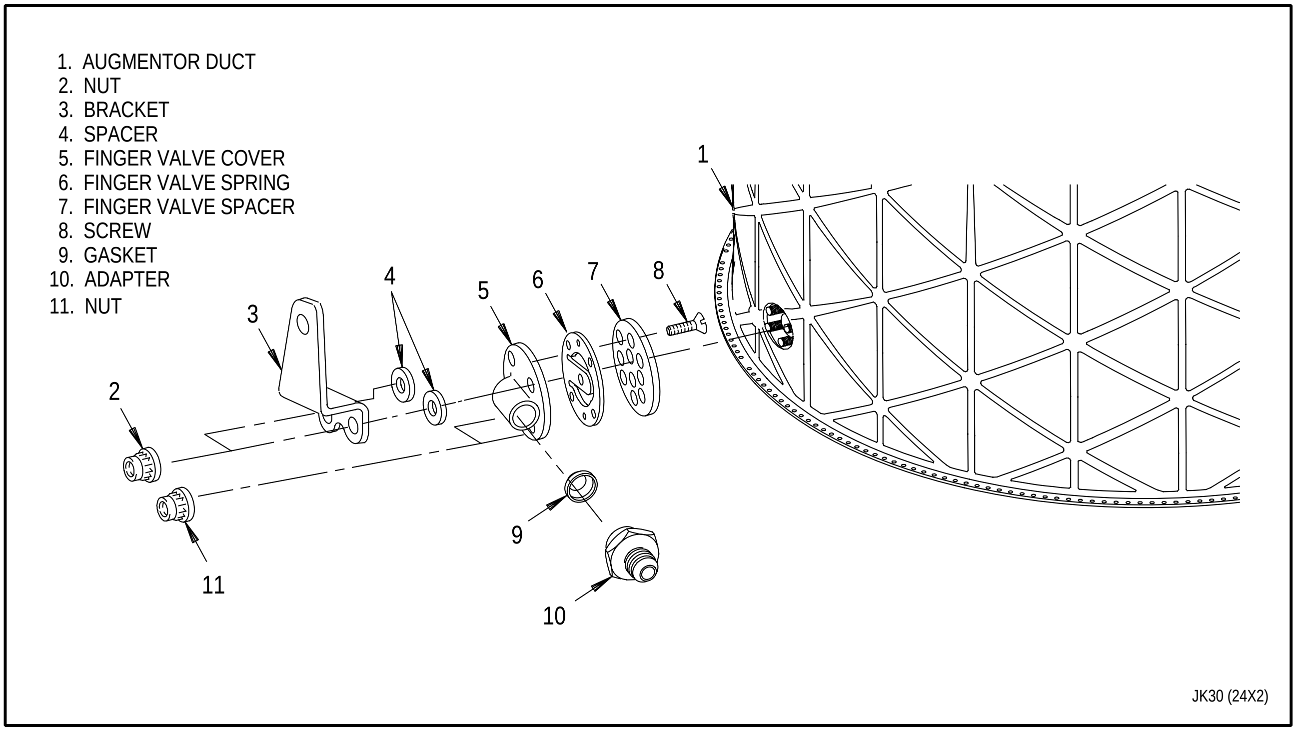


Figure 5. Augmentor Duct Finger Valve Assembly - Removal

WORK PACKAGE

INTRODUCTION

AUGMENTOR DUCT AND NOZZLE MODULE -

DISASSEMBLY OF SUBASSEMBLIES

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	0				

1. INTRODUCTION.

This work package introduces the 020 00 through 199 00 series of work packages, disassembly of subassemblies for the augmentor duct and nozzle module. The following work packages are included in this series:

WP No.	Title
021 00	Augmentor Nozzle Assembly - Disassembly
022 00	Seals and Convergent Liner, Augmentor Nozzle Segment - Disassembly
023 00	Nozzle Segments, Convergent, Augmentor - Disassembly
024 00 through 199 00	Open

WORK PACKAGE

TECHNICAL PROCEDURES

AUGMENTOR NOZZLE ASSEMBLY -

DISASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 18

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	11	10	11	14	0
4	3	11	9	15	7
5	9	12	0	16 Blank	7
6 - 8	0	13	11	17	0
9	9			18	11

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Lockwire (0.040 inch diameter)	MS9226-05
Tape, masking (cloth backing) (PMC 4001)	F.O.S. No. 57-2 Red Seamless Rubber Co. or Tuck Tape No. 90-W Red Tuck Industries Inc. or Mystik No. 5863 Red The Borden Chemical Co.

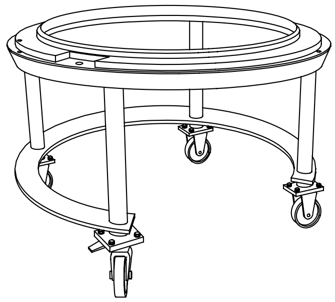
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

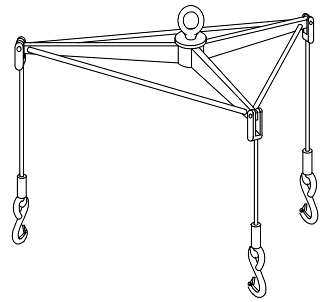
Paragraph	Function - Tool Nomenclature	Tool Number
6	Augmentor Nozzle Segments, Augmentor Nozzle Supports, Connecting Links, And Connecting Link Bracket - Removal	
	Wrench, Holding, augmentor nozzle support rear nut	PWA 53704
7	Augmentor Nozzle Synchronizing Ring - Removal	
	Stand, Augmentor duct and nozzle module build	PWA 51120
	Sling, Augmentor nozzle lifting	PWA 52644
	Adapter, Lifting, augmentor nozzle front flange, vertical only	PWA 52679
	Support, Build stand - augmentor nozzle front flange	PWA 55460
	Pin, Rigging set	PWA 57701

ILLUSTRATED SUPPORT EQUIPMENT



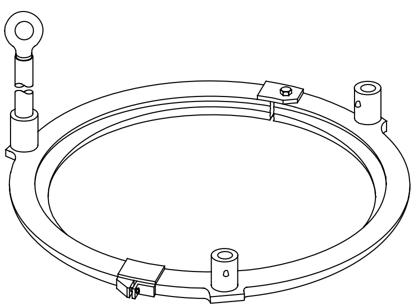
PWA 51120 –C

Figure T1. PWA 51120 Stand



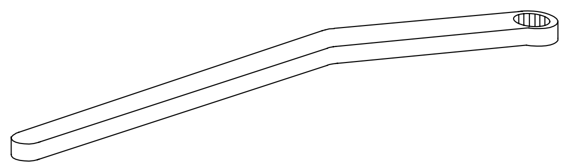
PWA 52644 –C

Figure T2. PWA 52644 Sling



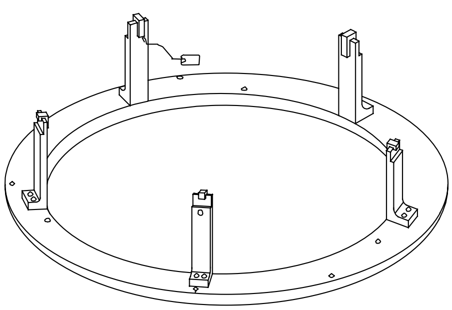
PWA 52679 –C

Figure T3. PWA 52679 Adapter



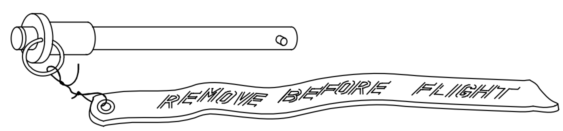
PWA 53704 –C

Figure T4. PWA 53704 Wrench



PWA 55460 –C

Figure T5. PWA 55460 Support



PWA 57701 –C

Figure T6. PWA 57701 Rigging Pin Set

1. INTRODUCTION.

a. This work package contains instructions for disassembly of the augmentor nozzle assembly.

2. PRELIMINARY INSTRUCTIONS.

a. Remove augmentor nozzle assembly from augmentor duct and nozzle module. Refer to T.O. 2J-F100-53-10, WP 011 00.

3. AUGMENTOR EXTERNAL NOZZLE SEGMENTS - REMOVAL FROM NOZZLE SUPPORT.

(See Figure 1.)

NOTE

Convergent nozzle should be in closed position.

a. Remove cotter pins(2, figure 1), nuts(3), and bolts(4) securing external nozzle segments(5) to divergent nozzle segments(1). Discard cotter pins.

b. Remove external nozzle segments(5), by sliding them rearward and away from divergent nozzle connecting link bracket(9).

CAUTION

Rod end bearing assembly has two configurations. One configuration has a bearing loading slot and the other one does not. Be careful to prevent bearing from falling out of loading slot because bearing could be damaged.

c. Remove rod end bearing assembly by removing bolts(6) and nuts(8), securing external nozzle rod end bearing(7) to bracket(9).

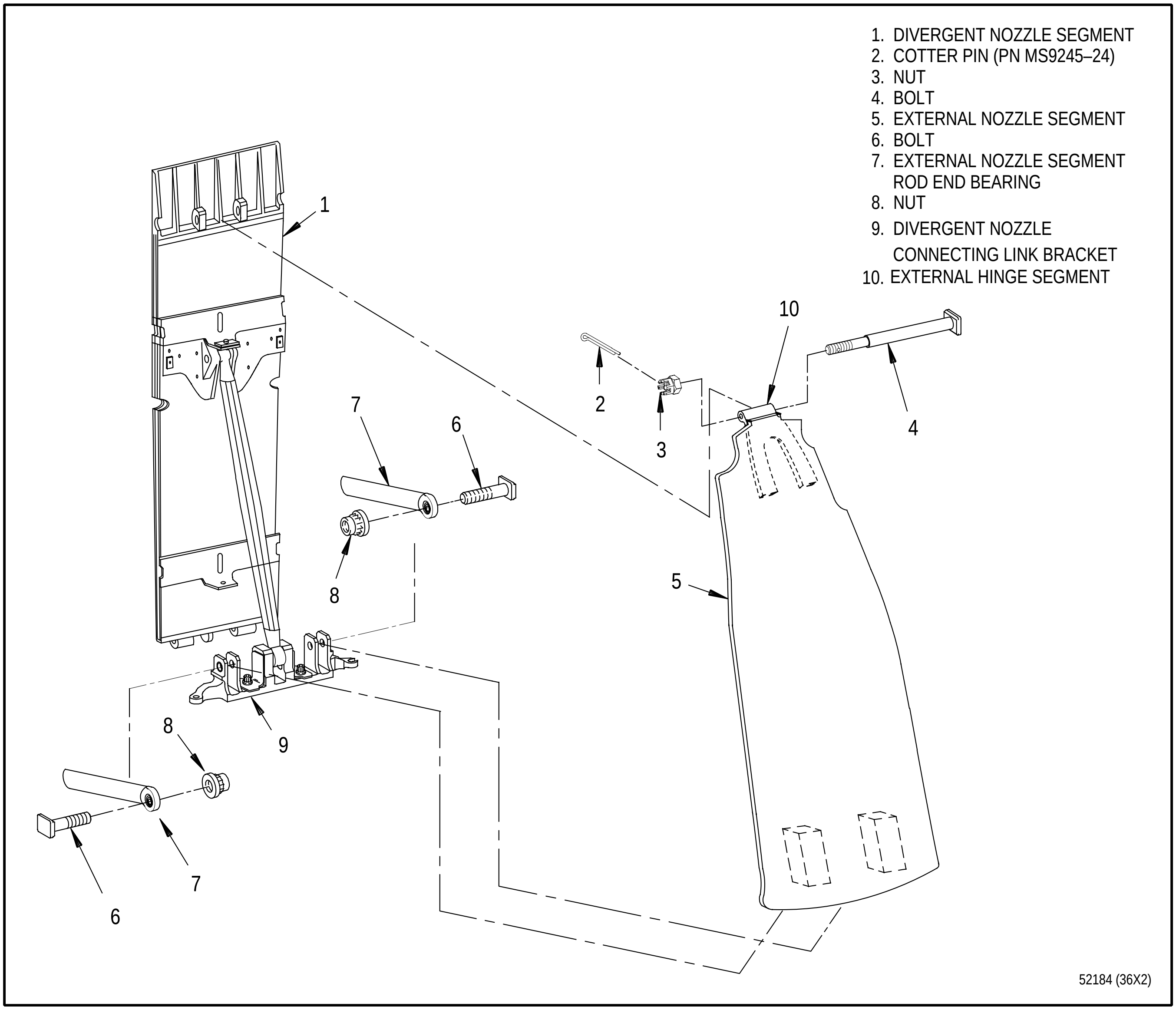


Figure 1. Augmentor External Nozzle Segments - Removal

4. AUGMENTOR CONVERGENT NOZZLE SEGMENT LINER - REMOVAL.
(See Figure 2.)

a. If necessary, remove external nozzle segments in line with, and adjacent to liner segment. Refer to paragraph 3.

b. Manually actuate nozzle to open position.

NOTE

Each convergent nozzle segment liner(5, figure 2) shall be removed separately.

c. Bend open hinge pin lock(3) between convergent nozzle segment(4) and divergent nozzle segment(1).

d. Remove hinge pin(2).

e. Remove convergent nozzle segment liner(5).

f. Discard hinge pin lock(3).

g. Reinstall hinge pin without replacing hinge pin lock at this operation.

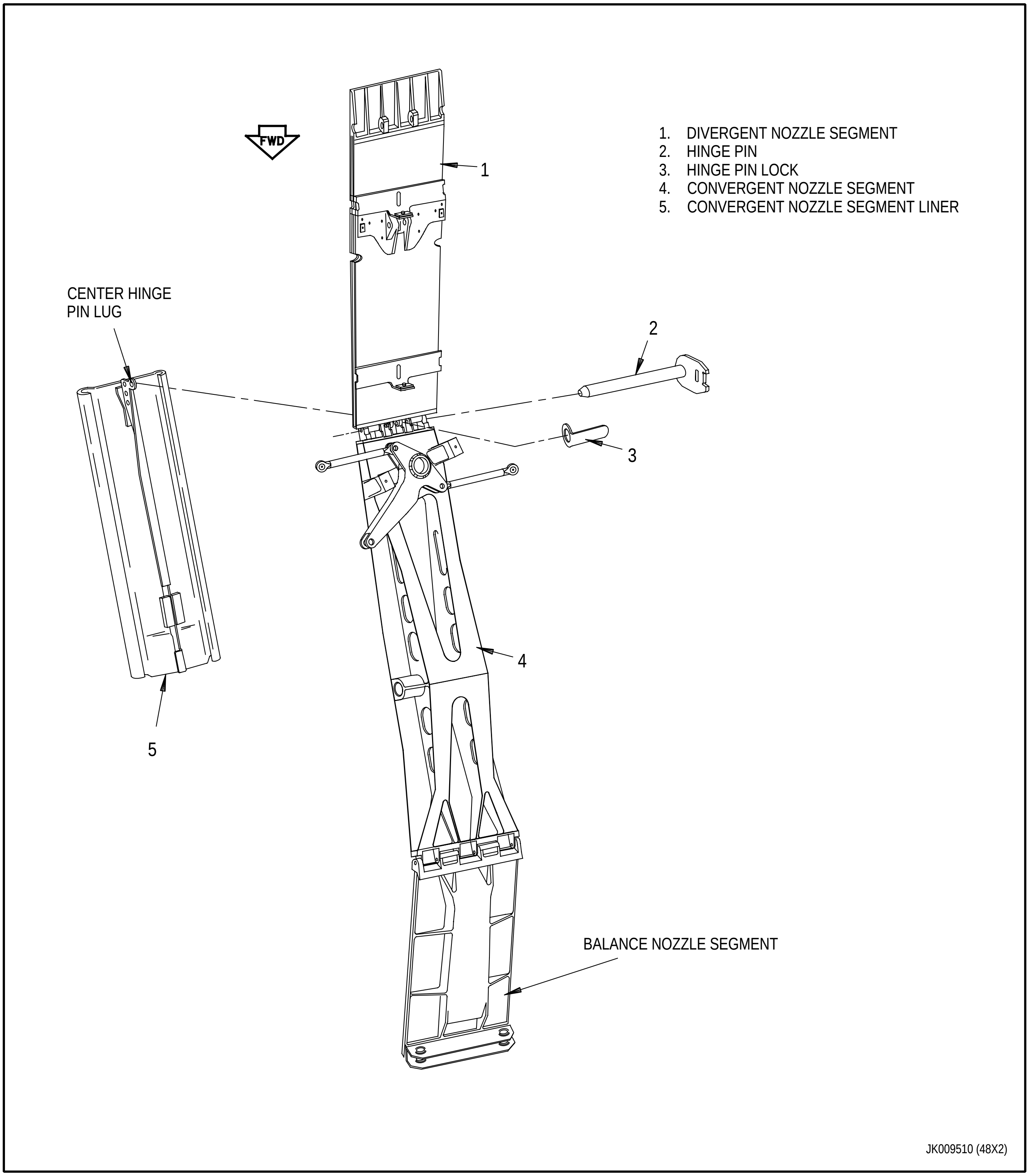


Figure 2. Augmentor Convergent Nozzle Segment Liner - Removal

5. AUGMENTOR NOZZLE SEGMENT SEALS - REMOVAL.
(See Figure 3.)

NOTE

When handling seals, do not let angle between balance and convergent nozzle segment seals become less than 120 degrees, or angle between divergent and convergent nozzle segment seals become less than 150 degrees.

a. Remove nuts(6) and bridge clamps(7) from divergent nozzle segment seal(8) at upper and lower locations.

b. Straighten key washer(1, figure 3). Remove pin(2) by rotating pin head and discard key washer(1).

c. Disengage slotted lugs(4) on side of convergent nozzle segment seal(5) from lugs on convergent nozzle segments. Slide out segment seals(3, 5, and 8) as an assembly.

d. Repeat steps a. through c. for remaining segment seals.

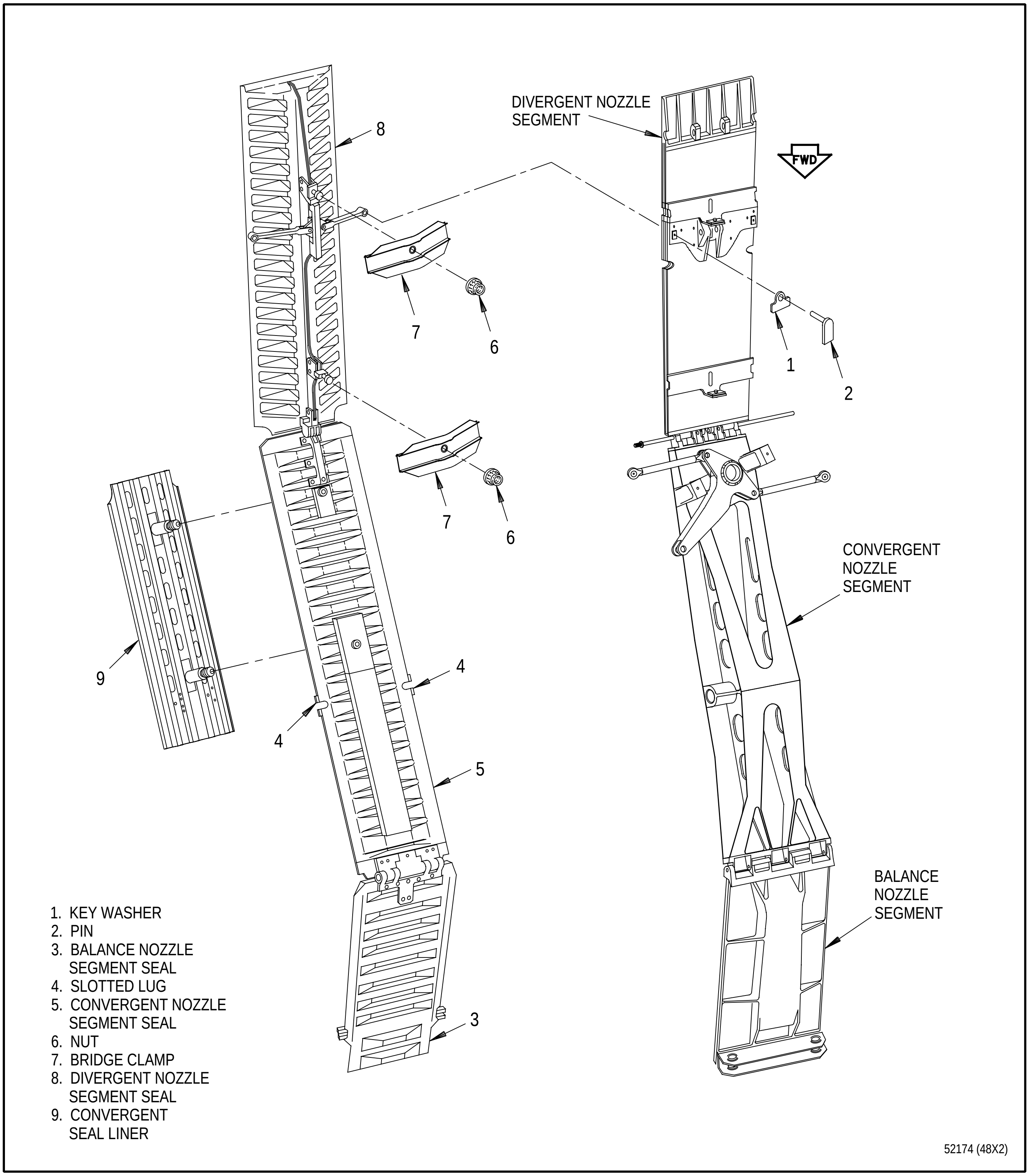


Figure 3. Augmentor Nozzle Segment Seals - Removal

6. AUGMENTOR NOZZLE SEGMENTS, AUGMENTOR NOZZLE SUPPORTS, CONNECTING LINKS, AND CONNECTING LINK BRACKET - REMOVAL.

(See Figures 4 through 6.)

CAUTION

Whenever nozzle linkage system is broken by removal of any connecting link, lever, convergent nozzle segment, or balance nozzle segment, all bolts(1, 6, and 10, figure 5) securing supports(4 and 7) shall be loosened. Bolts shall be torqued at proper steps during assembly to prevent binding.

a. Remove divergent nozzle segment(1, figure 4) as follows:

(1) Straighten key washer(3), support divergent nozzle segment, and remove pin(2) securing connecting link(4) to divergent nozzle segment(1). Discard key washer(3).

(2) Remove hinge pin(16) and remove divergent nozzle segment(1).

(3) Repeat procedure for remaining divergent nozzle segments.

b. Remove divergent nozzle connecting link(4) and bracket(8) as follows:

(1) Remove bolts(6), nuts(9), and pin retainers(7).

(2) Remove pins(5), and connecting link(4).

(3) Remove bracket(8).

(4) Repeat procedure for remaining connecting links and brackets.

c. Remove nuts(8, figure 5) and bolts(10).

d. Remove bolts(12, figure 6) and nuts(5) securing connecting links(6) to levers(11).

e. Remove short connecting links(4) as follows:

(1) Straighten tabs of locks(3) securing connecting links to convergent nozzle segments(10). Remove locks from slotted head pins(2) and discard locks(3).

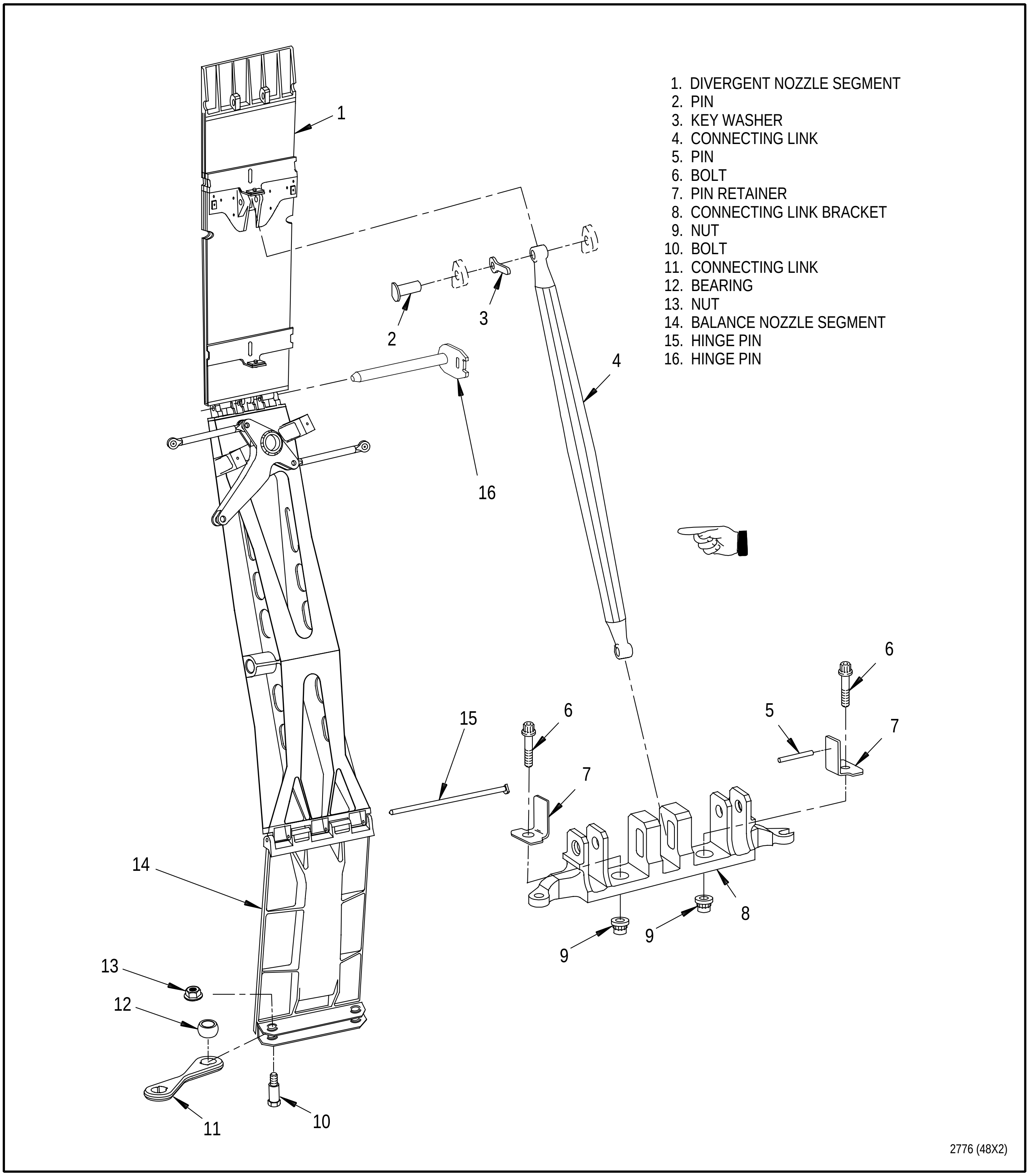


Figure 4. Augmentor Nozzle Connecting Links and Connecting Link Bracket - Removal

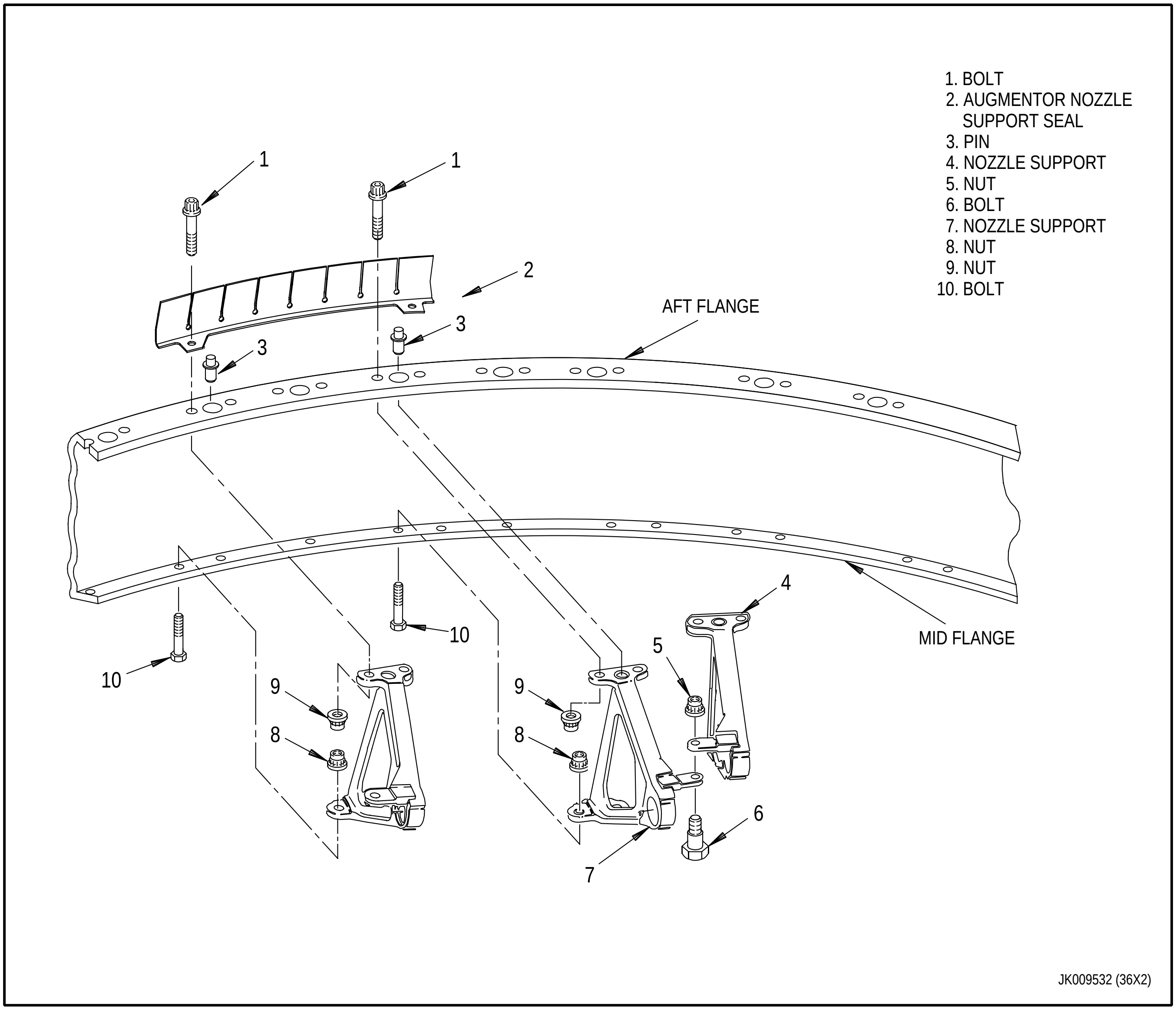


Figure 5. Augmentor Nozzle Supports - Removal

NOTE

- If pin has coke deposits on it, a screwdriver may be used to twist pin and remove deposits.
- If pin breaks during removal, the shank end of the pin may be left inside the segment cover cavity.

(2) Pry pin(2) up until it starts to come out of cover. Use pliers or screwdriver to lift pin out of cover.

(3) Remove connecting links(4).

(4) Tape connecting links(4) to lever(11).

NOTE

F-16 augmentor duct and nozzle modules have augmentor nozzle support seals(2, figure 5).

f. Using PWA 53704 wrench to hold nuts(9), remove bolts(1) and nuts(9).

g. Remove one connecting link(11, figure 4) by removing bolt(10) and nut(13) from one side of each balance nozzle segment(14).

h. If spherical bearing(12) is worn or damaged, remove bearing from connecting link.

i. Remove balance nozzle segments from nozzle support as follows:

   (1) Position balance nozzle segment(14) inward, remove hinge pin(15) and remove balance nozzle segment(14).

   (2) Repeat procedure for remaining balance nozzle segments.

   (3) Remove connecting link(11) by removing bolt(10) and nut(13) from balance nozzle segment(14).

j. Remove bolts(9, figure 6), and nuts(7) securing connecting links(6) to upper lugs on synchronizing ring(8). Remove tape and connecting links.

k. If spherical bearing(12) is worn or damaged, remove bearing from connecting link.

l. Remove convergent nozzle segments from nozzle support as follows:

   (1) Remove bolts(6, figure 5) and nuts(5) securing side lugs of supports(4 and 7).

   (2) Remove pin(3) securing one support.

   (3) Swing support away from convergent nozzle segment. Remove convergent nozzle segment from remaining support.

   (4) Repeat steps 2 and 3 for remaining nozzle segments.

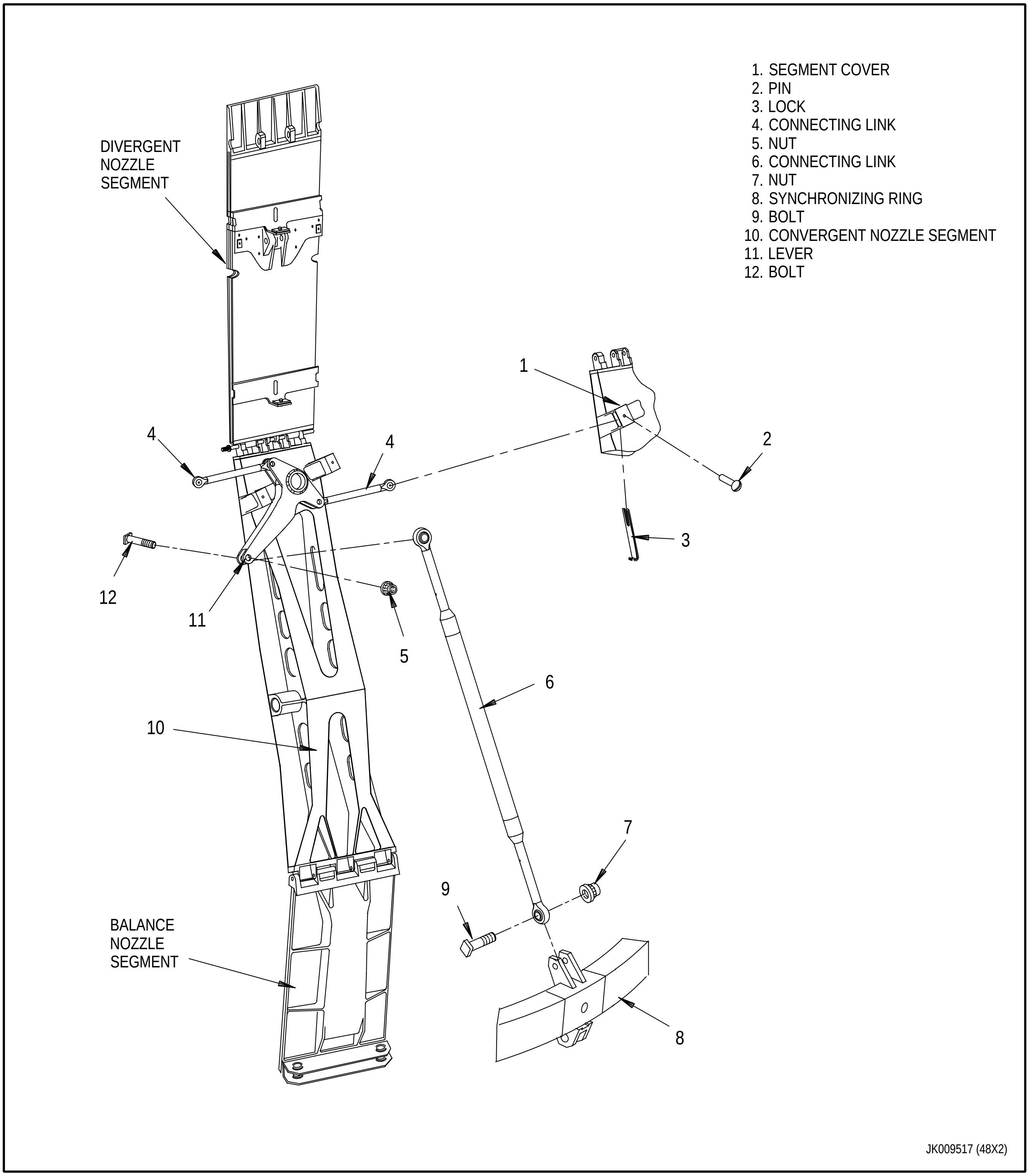


Figure 6. Augmentor Nozzle Connecting Links - Removal

Figure 7. Deleted.

7. AUGMENTOR NOZZLE SYNCHRONIZING RING - REMOVAL.

(See Figures 8 and 9.)

a. Remove bolts(6, figure 8) and nuts(5) securing synchronizing ring connecting links(8) to bottom lugs of synchronizing ring(10).

b. Slide connecting links(8) out of tracks in augmentor nozzle support(1). Remove runners(7) and pins(9) from connecting links.

c. Remove cam followers(11) by removing cotter pins(4), nuts(3), and washers(2). Discard cotter pins(4).

d. Remove synchronizing ring(10) as follows:

(1) Remove PWA 51120 build stand support detail-6 clamps(7, figure 9).

(2) Secure ring to build stand support(3) using MS9226-05 lockwire.

(3) Raise nozzle support(5, figure 9) from PWA 51120 build stand(4) as follows:

(a) Position PWA 52679 lifting adapter(2) and PWA 52644 sling(1) over nozzle support(5).

(b) Open adapter so that it sufficiently clears OD of nozzle support.

(c) Lower adapter onto front flange of nozzle support and secure using detail-10 swing bolt(6).

(d) Carefully raise nozzle support assembly(5). Ensure that front flange of nozzle support sits on step of adapter.

(4) Remove synchronizing ring from build stand.

(5) Lower nozzle support assembly(5) back onto PWA 55460 build stand support(3) and PWA 51120 build stand(4). Secure nozzle support assembly using support detail-6 clamps(7).

(6) Remove PWA 52679 lifting adapter from nozzle support.

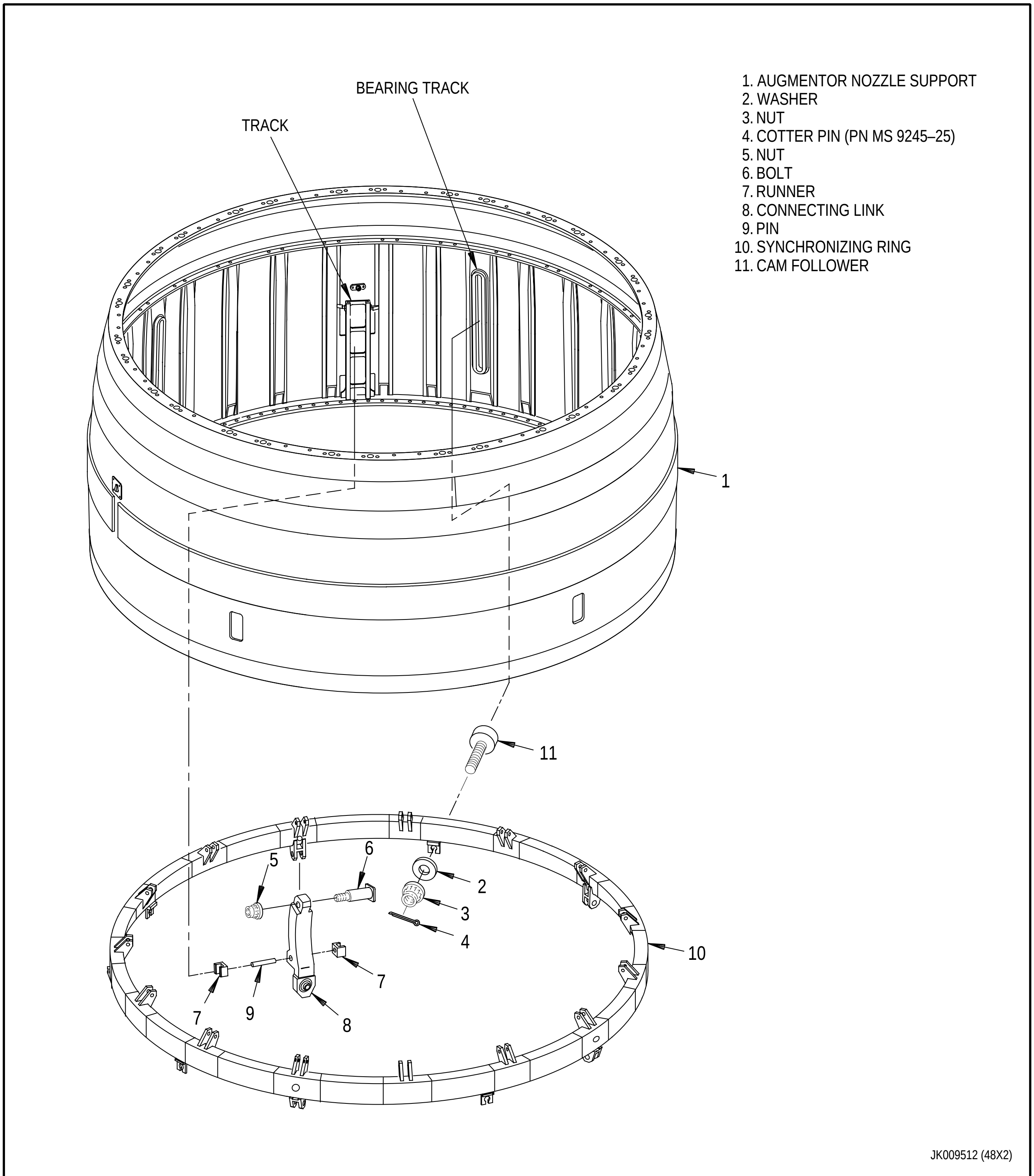
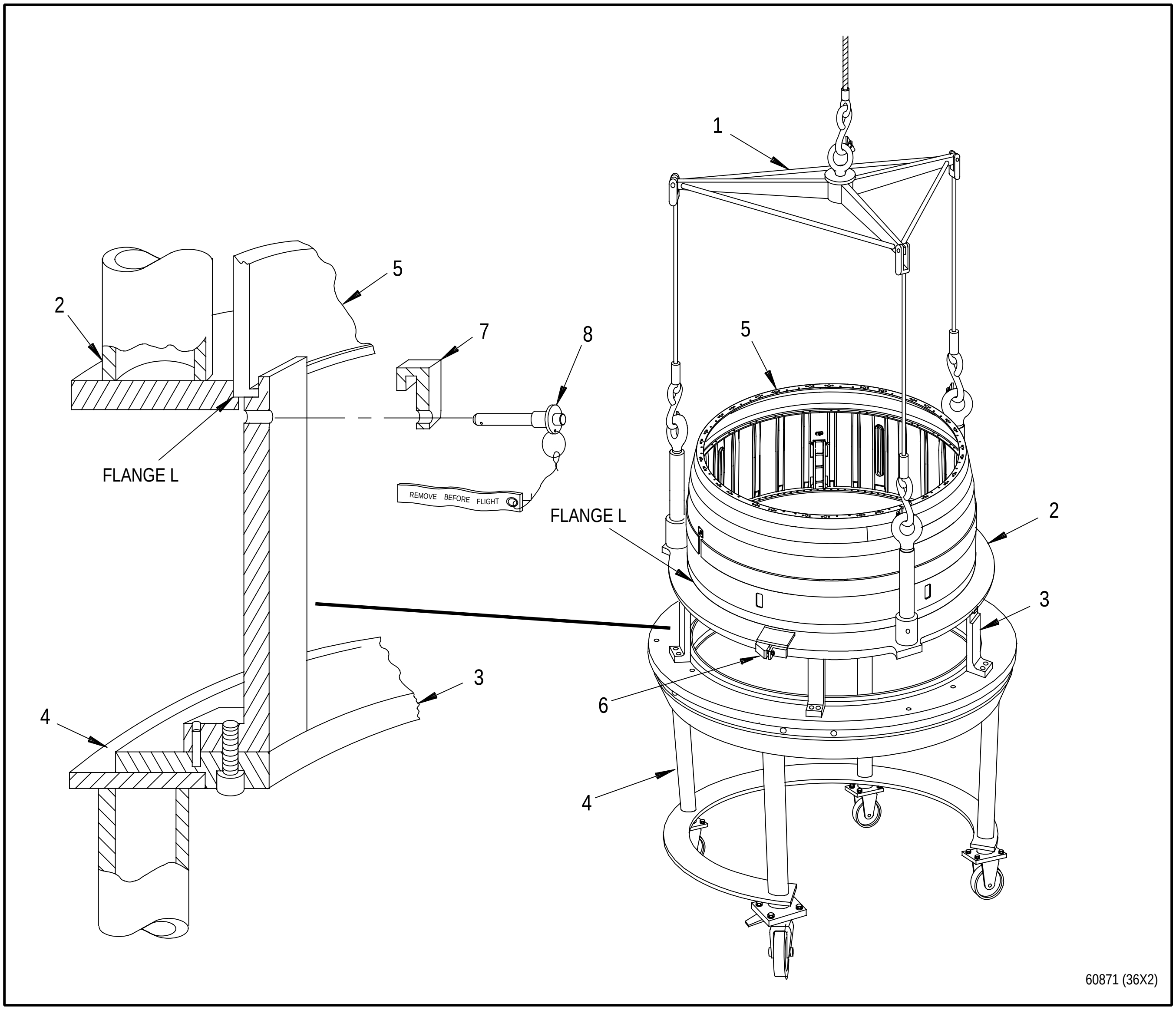


Figure 8. Augmentor Nozzle Synchronizing Ring - Removal



1. PWA 52644 Sling
2. PWA 52679 Lifting adapter
3. PWA 55460 Build stand support
4. PWA 51120 Build stand
5. Nozzle support assembly
6. Swing bolt detail
7. Clamp detail
8. PWA 57701 Rigging pin

Figure 9. Augmentor Nozzle Support In Build Stand

WORK PACKAGE

TECHNICAL PROCEDURES

SEALS, AND CONVERGENT LINER, AUGMENTOR NOZZLE SEGMENT -

DISASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 5	0				
6 Blank	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for disassembly of the augmentor nozzle segment seals.

2. PRELIMINARY INSTRUCTIONS.

a. Remove augmentor nozzle segment seals from augmentor nozzle assembly per T.O. 2J-F100-53-10, WP 021 00.

3. AUGMENTOR NOZZLE SEGMENT SEALS - DISASSEMBLY.

(See Figure 1.)

CAUTION

When handling seals, do not let angle between balance and convergent nozzle segment seals become less than 120 degrees, or angle between divergent and convergent nozzle segment seals become less than 150 degrees.

a. Place seals flat side down on bench.

b. Remove nuts(4, figure 1) securing liner(6) to convergent nozzle segment seal(5). Lift seals off liner.

c. Remove rivet(8) securing hinge pin lock(7) to convergent seal(5) by grinding or drilling out flared end of rivet.

d. Remove pins(9) securing balance seal(10) to convergent seal(5).

e. Remove pin(3) and washer(2) securing convergent seal(5) to divergent seal(1) by grinding off or drilling out flared end of pin. Discard pin.

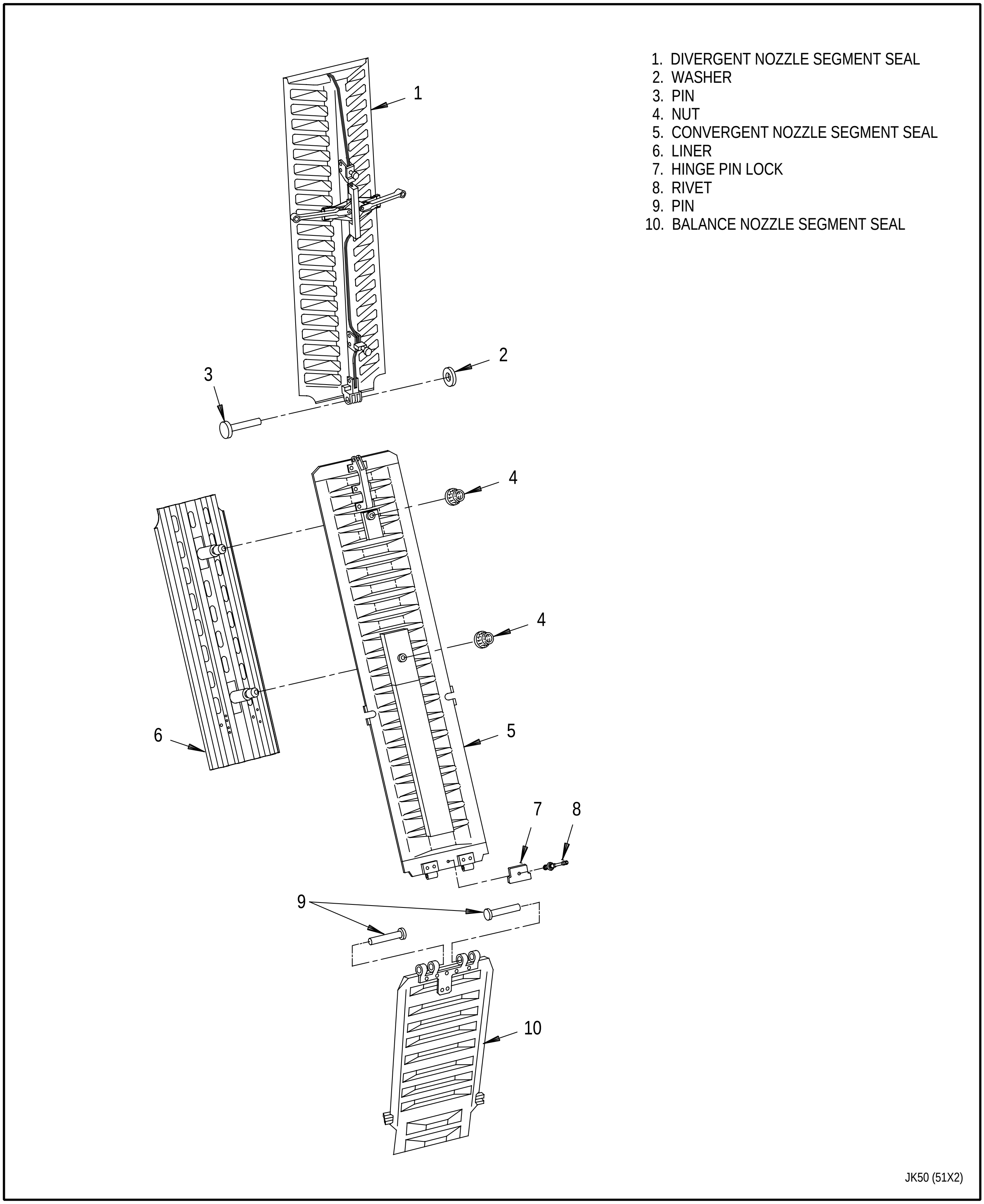


Figure 1. Augmentor Nozzle Segment Seals - Disassembly

WORK PACKAGE

TECHNICAL PROCEDURES

NOZZLE SEGMENTS, BALANCE AND CONVERGENT, AUGMENTOR -

DISASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 14

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	17	6 - 8	11	11	17
4	0	9	13	12 - 13	9
5	9	10	9	14 Blank	9

REFERENCE MATERIAL REQUIRED

Title	Number
Augmentor Duct and Nozzle Module ----------------	T.O. 2J-F100-53-10
Bearing, Augmentor Nozzle Lever - Inspection and Repair	WP 302 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
3	AUGMENTOR BALANCE AND CONVERGENT NOZZLE SEGMENTS - DISASSEMBLY	
	PIN --------------------------------	PWA 55457
	WRENCH, CONVERGENT SEGMENT, BELLCRANK RETENTION NUT --------------------------------	PWA 55867
	DRIFT, GUIDE POST AUGMENTOR CONVERGENT SEGMENT --	PWA 55451
	PULLER, AUGMENTOR NOZZLE LEVER FROM FLAP ------	PWA 53860
	DRIFT, AUGMENTOR NOZZLE LEVER BEARING --------	PWA 56510
	PUSHER/PULLER, AUGMENTOR CONVERGENT SEGMENT BUSHINGS ---------------------------	PWA 57790

ILLUSTRATED SUPPORT EQUIPMENT

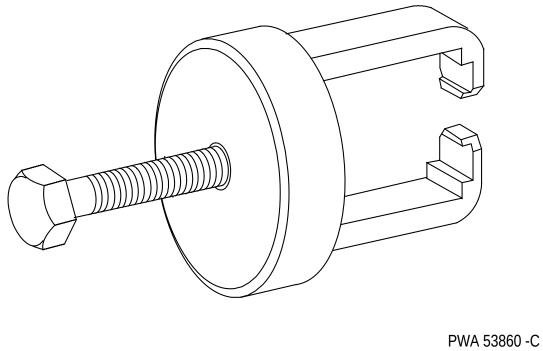


Figure T1. PWA 53860 PULLER

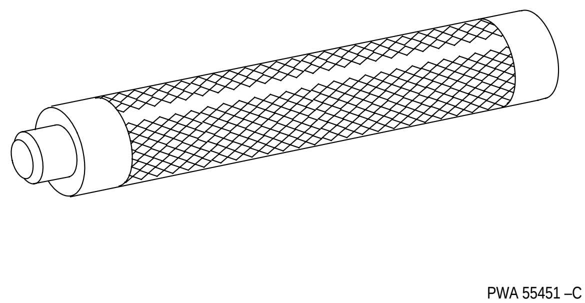


Figure T2. PWA 55451 DRIFT

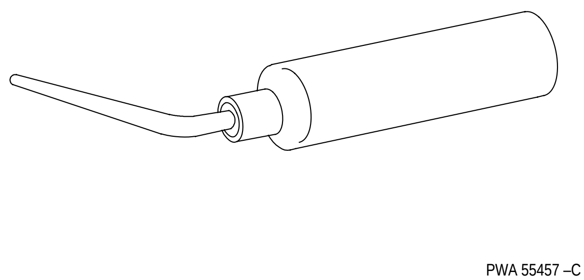


Figure T3. PWA 55457 PIN

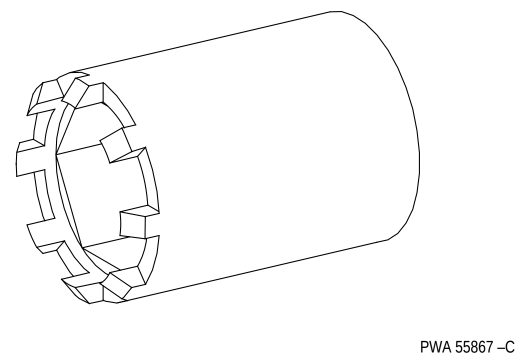


Figure T4. PWA 55867 WRENCH

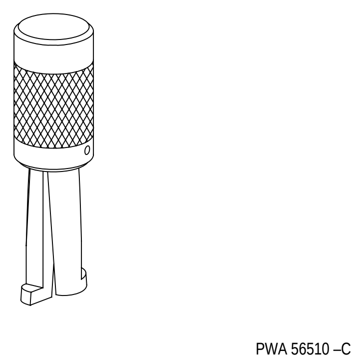


Figure T5. PWA 56510 DRIFT

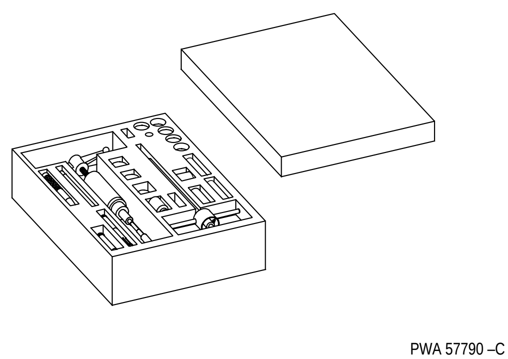


Figure T6. PWA 57790 PUSHER/PULLER

1. INTRODUCTION.

a. This work package contains instructions for disassembly of augmentor convergent nozzle segments.

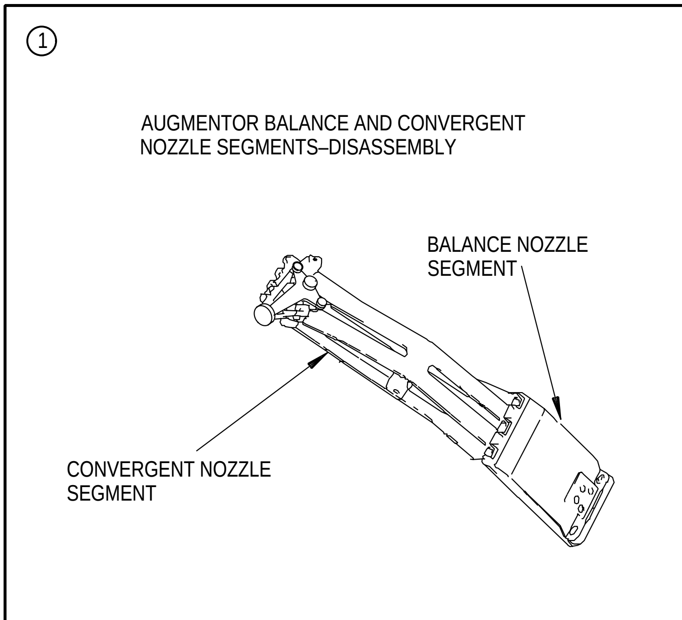
2. PRELIMINARY INSTRUCTIONS.

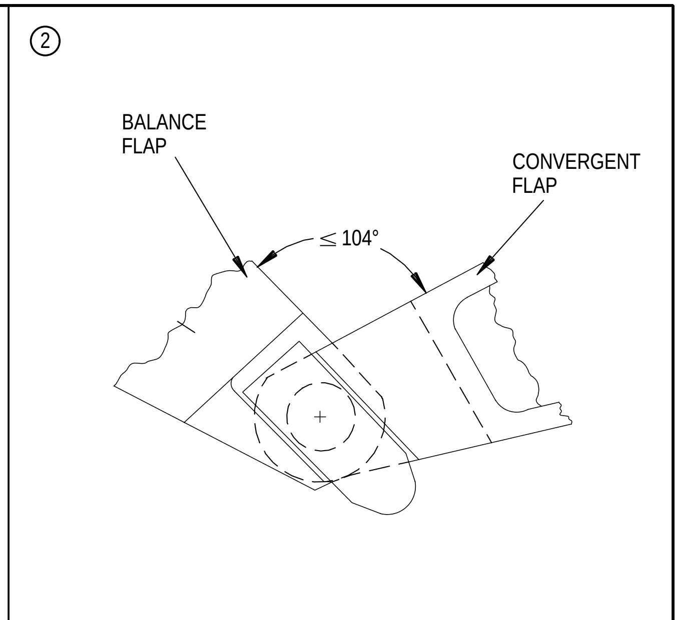
a. Remove augmentor balance and convergent nozzle segments from augmentor nozzle assembly. Refer to T.O. 2J-F100-53-10, WP 021 00.

3. AUGMENTOR BALANCE AND CONVERGENT NOZZLE SEGMENTS - DISASSEMBLY.

(See Figures 1 and 2.)

a. Disassemble balance and convergent nozzle segment. See figure 1.





(1) REMOVE BALANCE NOZZLE SEGMENT FROM CONVERGENT NOZZLE SEGMENT AS FOLLOWS:

(2) ROTATE SEGMENTS TO FULLY EXPOSE HINGE PIN HEAD.

(3) USING A MALLET AND 0.200 DIAMETER PUNCH, REMOVE HINGE PIN FROM HINGE JOINT BETWEEN CONVERGENT NOZZLE SEGMENT AND BALANCE NOZZLE SEGMENT.

NOTE

ALL DIMENSIONS IN INCHES

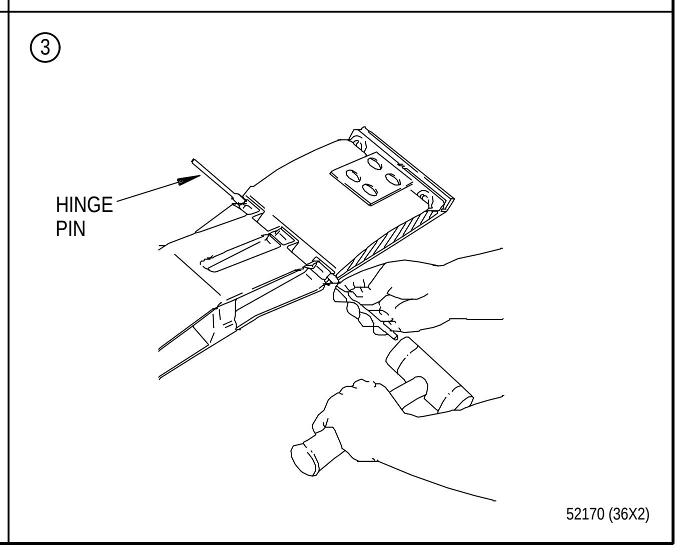


Figure 1. Augmentor Balance and Convergent Nozzle Segments - Disassembly

b. Remove augmentor nozzle lever from convergent nozzle segment as follows:

(1) Straighten tabs of key washer.

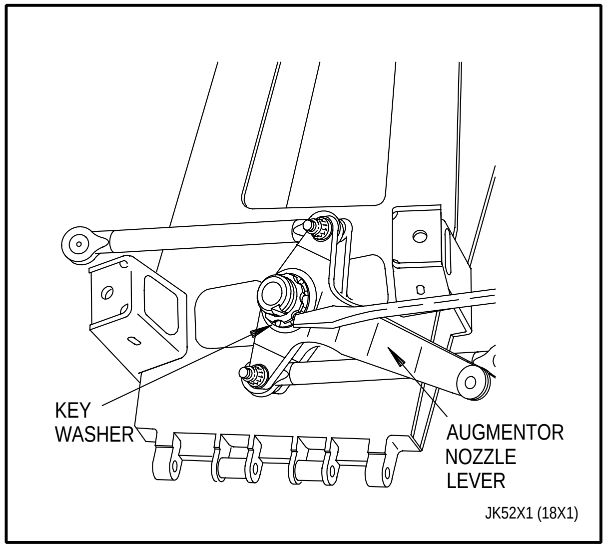


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 1 of 14)

(2) Insert PWA 55457 into antirotation hole in guide to prevent guide from turning.

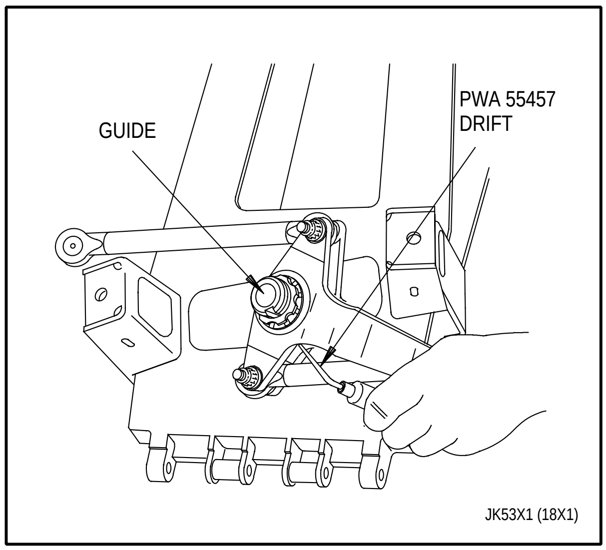


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 2 of 14)

(3) Remove nut using PWA 55867 wrench.

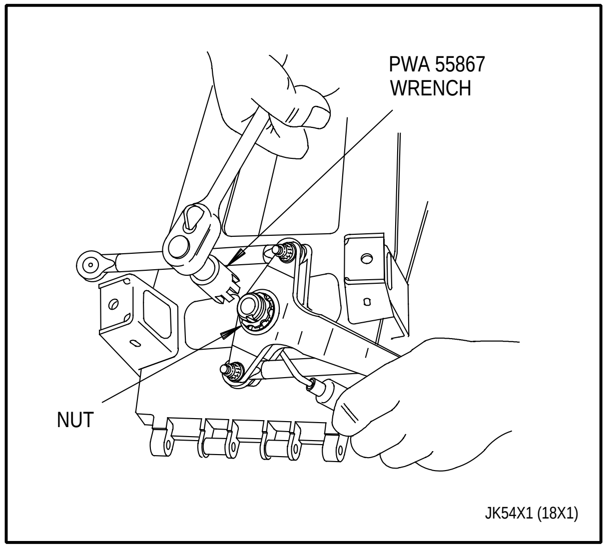


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 3 of 14)

(4) Remove key washer and PWA 55457.

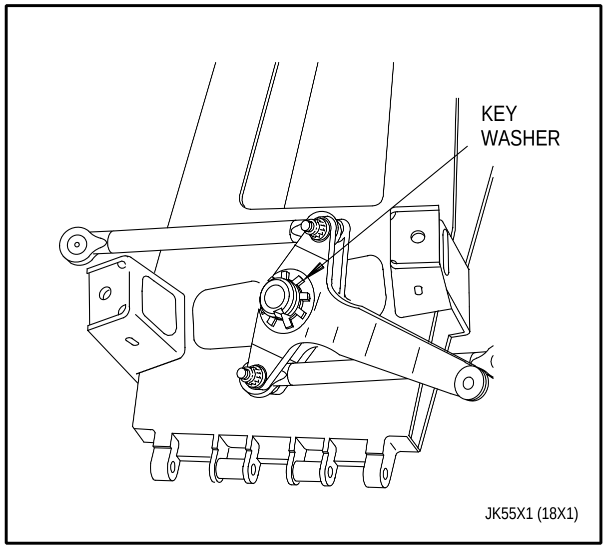


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 4 of 14)

(5) If guide cannot be removed by hand, perform the following steps:

(a) To avoid damage, place convergent nozzle segment flat side down on wooden blocks or equivalent. Position guide on 3/4 inch hole.

(b) Position PWA 55451 drift on guide. Tap guide out approximately 1/4 inch.

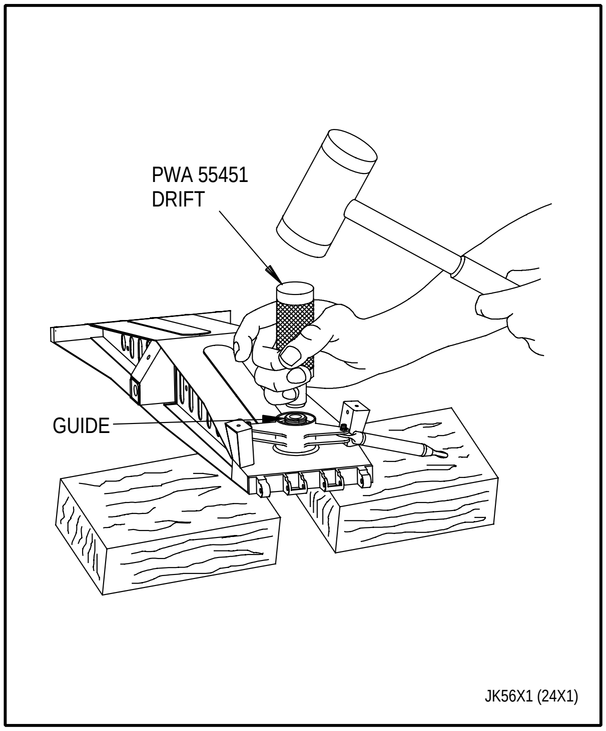


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 5 of 14)

(6) Insert PWA 55457 into antirotation hole in guide.

(7) Place PWA 53860 puller on guide. Position detail-5 jaws under lever.

(8) Support detail-5 jaws with detail-8 caps.

CAUTION

Lever’s freedom of movement shall be checked constantly while using puller in order to avoid damage to bearings.

(9) Turn detail-3 cap screw to separate lever from guide.

(10) Remove PWA 55457, guide, and lever.

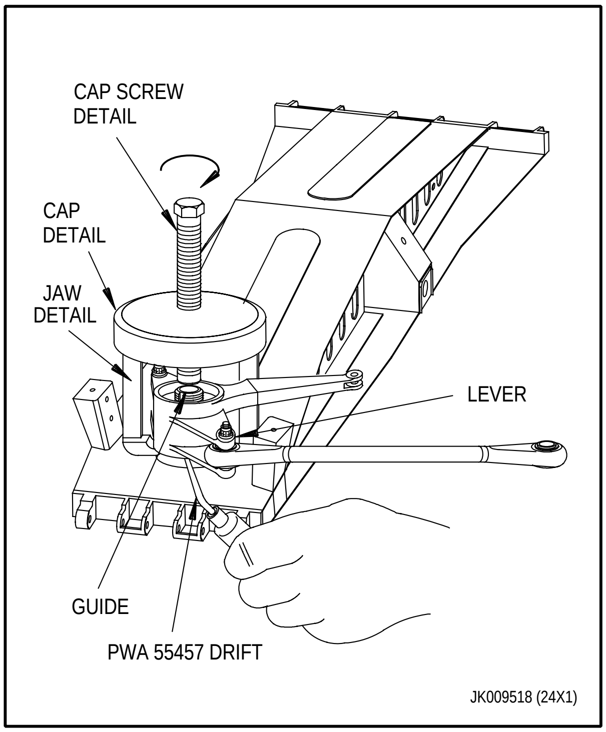


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 6 of 14)

(11) Remove nuts and bolts securing connecting links to lever.

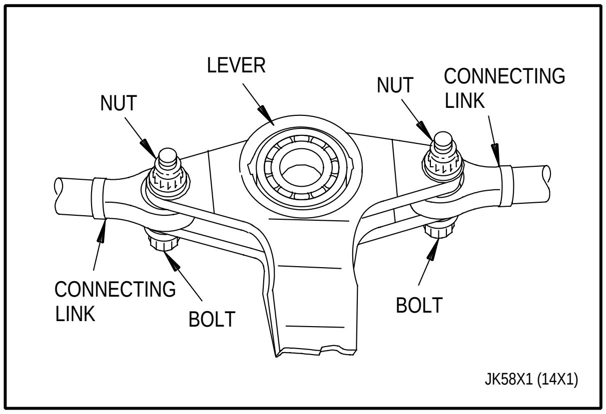


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 7 of 14)

NOTE

If bearings require cleaning only, they shall not be removed from lever.

(12) Determine whether bearings need to be removed per WP 302 00.

(13) If necessary, remove bearings by hand, or as follows:

(a) Pull PWA 56510 drift detail-7 feet out of detail-1 handle and collapse feet.

(b) Pass feet through bore of upper bearing.

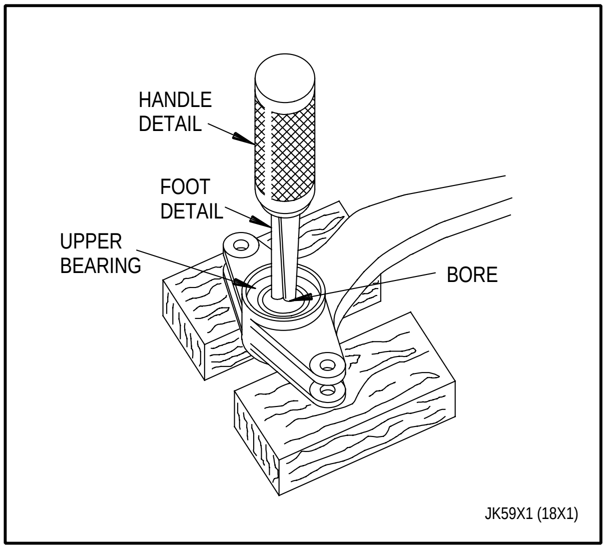


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 8 of 14)

NOTE

Ensure feet are aligned with two slots in lever bore.

(c) Push handle down lightly to expand and lock feet under upper bearing.

(d) Hold lever firmly while unseating lower bearing with light, nonmetallic mallet.

(e) Turn lever over and repeat procedure for other bearing.

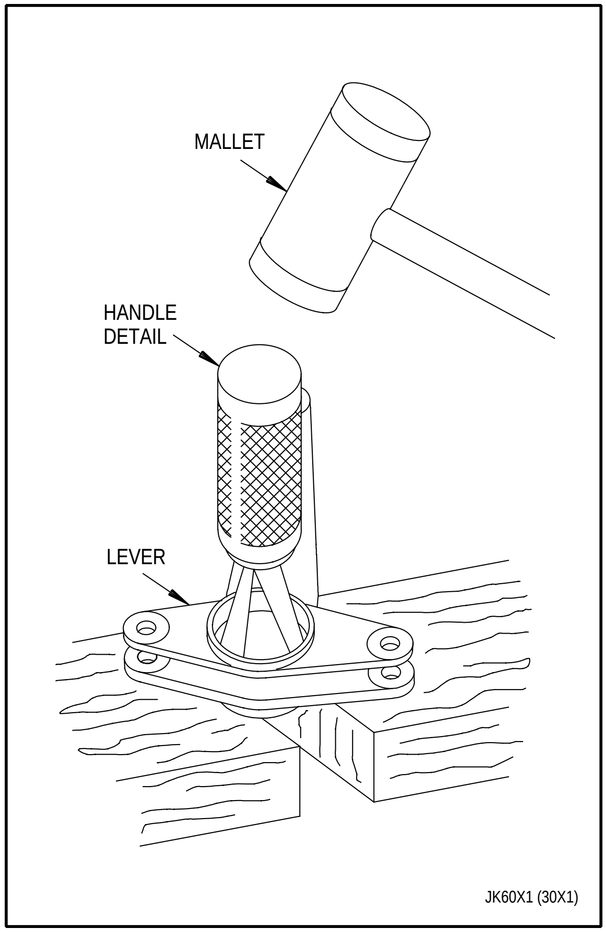


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 9 of 14)

c. Remove pin from convergent nozzle segment.

d. Remove sleeve bearings from convergent nozzle segment as follows:

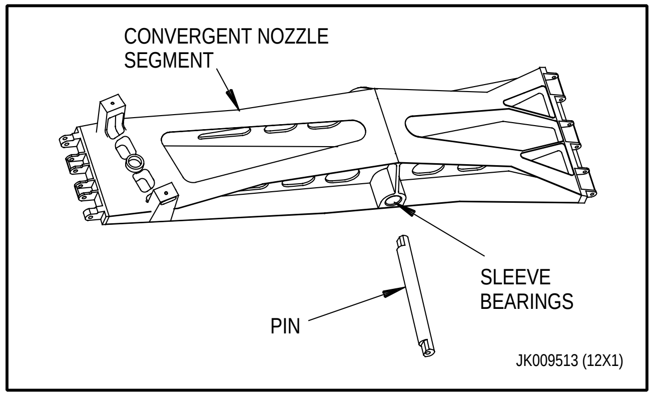


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 10 of 14)

(1) Insert PWA 57790 pusher/ puller detail-11 collet into convergent nozzle segment, aligning line on collet with nozzle segment.

(2) Insert detail-12 expander into detail-11 collet.

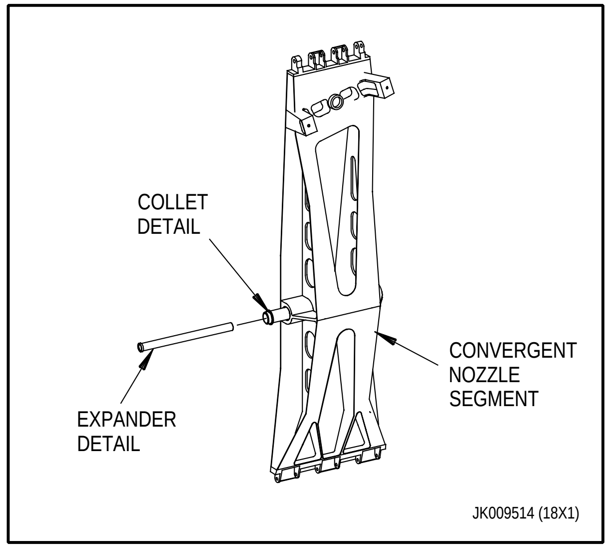


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 11 of 14)

NOTE

Small ID end of detail-10 spacer shall be inserted into thrust bearing of detail-4 cover assembly.

(3) Install detail-10 spacer and detail-4 cover assembly onto detail-1 ball screw. Do not remove cover assembly detail from ball screw detail.

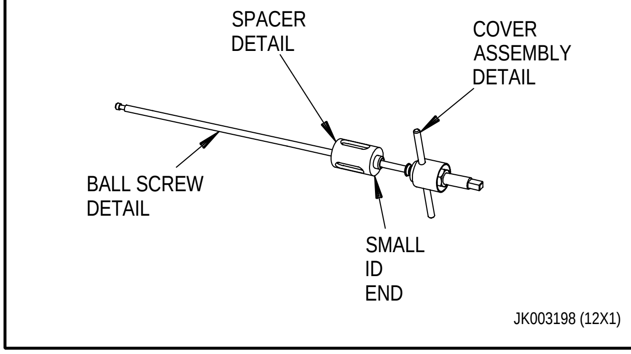


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 12 of 14)

(4) Insert detail-1 ball screw through convergent nozzle segment and detail-12 expander. Position detail-10 spacer on convergent nozzle segment.

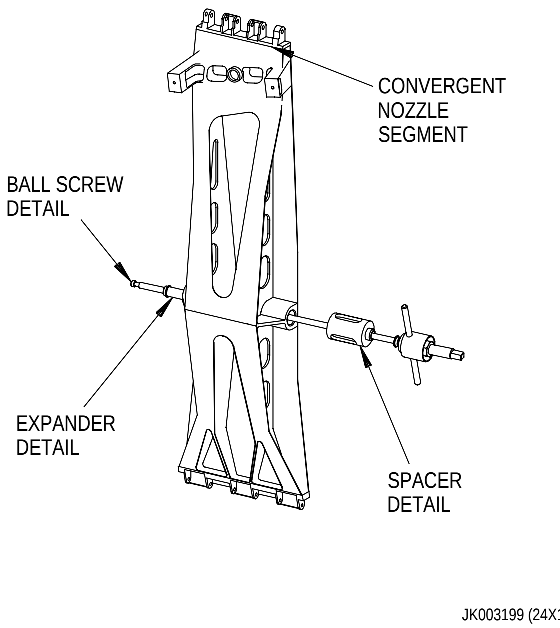


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 13 of 14)

(5) Position detail-17 end cap assembly on end of detail-1 ball screw detail. Slide detail-18 slider to engage groove in ball screw detail.

(6) Hold handle of detail-4 cover assembly and turn using 1/4 inch open end wrench to remove sleeve bearing.

(7) Repeat steps 1 through 6 for other sleeve bearing.

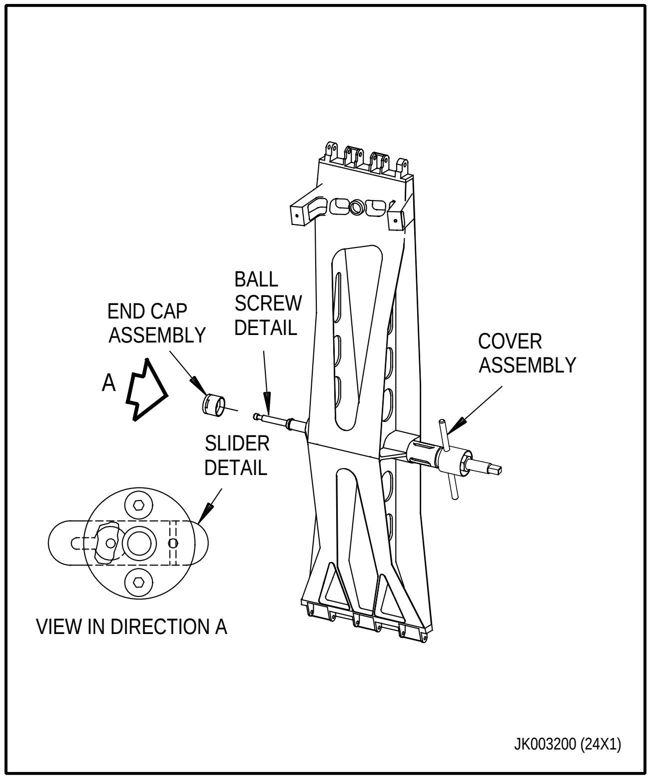


Figure 1. Augmentor Convergent Nozzle Segments - Disassembly (Sheet 14 of 14)

WORK PACKAGE

INTRODUCTION

AUGMENTOR DUCT AND NOZZLE MODULE -

CLEANING

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	0				

1. INTRODUCTION.

This work package introduces the 200 00 through 299 00 series of work packages for the augmentor duct and nozzle module - cleaning. The following work packages are included in this series:

WP No.	Title
201 00	Augmentor Duct and Nozzle Module - Cleaning
202 00	Augmentor Nozzle Assembly - Cleaning
203 00 through 299 00	Open

WORK PACKAGE

TECHNICAL PROCEDURES

AUGMENTOR DUCT AND NOZZLE MODULE -

CLEANING

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 24

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	18	6	16	11	9
2	16	7 - 8	0	12 - 13	0
3	0	9	16	14 - 15	18
4	16	10	0	16	17
5	0			17 - 24	0

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Cleaning of Demountable, Semi-demountable, and Non-demountable Bearings (Alkaline Rust Remover Method)	SPOP 216
Nondestructive Inspection	T.O. 2J-F100-9
Introduction and General Information	T.O. 2J-F100-53-1
Cleaning, Vapor Degreaser (SPOP 3)	SWP 031 01
Cleaning, Soft Grit Blast (SPOP 8)	SWP 031 05
Cleaning, Alkaline Rust Remover, Quick Soak (SPOP 18)	SWP 031 08
Cleaning, Alkaline Rust Remover, Long Soak (SPOP 203)	SWP 031 09
Cleaning, Wet Abrasive Blast (SPOP 9)	SWP 031 19
Cleaning, PWA 474 Antigalling Compound Removal From Titanium Compressor Blade Roots (SPOP 253)	WP 041 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, LAPPING	CORUNDUM 302 1/2
LUBRICANT, PENETRANT, RUST INHIBITOR (PWA 36043)	WD-40, PERMATEX PENETRATING OIL, CRC, MARVEL MYSTERY OIL
TAPE, MASKING (PMC 4001)	F.O.S. #57-2 RED OR TUCK TAPE #90-W RED OR MYSTIK #5863 RED OR #222 OR TB-30-113 KENDALL CORP.
TRICHLOROETHANE, INHIBITED (-1,1,1) (PMC 9056)	MIL-T-81533

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for cleaning augmentor duct and nozzle module parts.

2. AUGMENTOR DUCT AND NOZZLE MODULE - CLEANING.

3. GENERAL CLEANING PRECAUTIONS.

a. Care should be taken to protect part numbers and service markings from being obliterated during cleaning. Critical surfaces should also be protected from possible damage during cleaning. Precautions, such as masking, should be taken to protect these areas.

b. To avoid the possibility of damage caused by residual oil, grease, cleaning fluid, or other liquids, ensure that all blind holes which will contain studs, bolts, inserts, screws, bushings, etc. are thoroughly cleaned and drained of all fluid or grit.

c. T.O. 2-1-111 and T.O. 2J-F100-53-1 contain Service Process Operation Procedures (SPOP) used for cleaning parts. Each SPOP has a different chemical or blast strength suitable for cleaning certain parts.

(1) The chemical severity of these SPOP in order of increasing strength, is as follows:

- SPOP 3
- SPOP 7
- SPOP 8
- SPOP 4
- SPOP 18
- SPOP 203
- SPOP 13
- SPOP 213
- SPOP 9
- SPOP 11
- SPOP 211

(2) The blasting severity rating of these SPOP in order of increasing strength, is as follows:

- SPOP 8
- SPOP 9
- SPOP 16
- SPOP 219
- SPOP 218

d. Certain engine parts, either during manufacture and/or repair, are coated with various types of metal sprays. Before cleaning a repaired area;

(1) Determine whether any form of metal spray was used.

(2) Refer to T.O. 2-1-111 and T.O. 2J-F100-53-1 for acceptable cleaning processes for plasma sprayed or flameplated parts.

e. If abrasive methods are used to clean flamesprayed parts, do not erode surface coat.

4. AUGMENTOR NOZZLE SUPPORT BEARING - CLEANING.

a. Soak bearings in rust inhibiting lubricant (WD-40, Permatex Penetrating Oil, CRC, Marvel Mystery Oil) for four to eight hours. Move by hand to free seized bearings.

b. Clean per T.O. 2-1-111, SPOP 216.

c. Apply aluminum oxide lapping compound, corundum 302 1/2, 2 to 3 microns between ball and race to those bearings still exhibiting roughness. Hand rotate bearings.

d. Reclean bearings per T.O. 2-1-111, SPOP 216. Bearings which do not move freely after cleaning are not serviceable.

5. ANTIFRICTION BEARINGS.
(Refer to SPOP 14 in T.O. 2-1-111.)

6. RECOMMENDED CLEANING PROCESSES.
(See Table 1 and T.O. 2-1-111.)

a. Augmentor duct and nozzle module parts listed in table 1 shall be cleaned in carefully controlled chemical baths and water rinses or other regulated processes.

b. Table 1 contains a list of parts in the augmentor duct and nozzle module and a recommended cleaning process. Each part in the table is:

- Identified by part name, part number, and illustration
- Keyed to one or more cleaning procedure or process by SPOP number in T.O. 2J-F100-53-1, or special instruction is given.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures

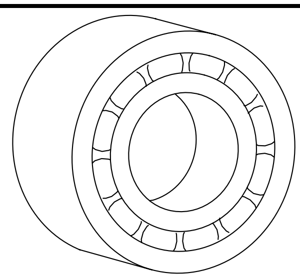
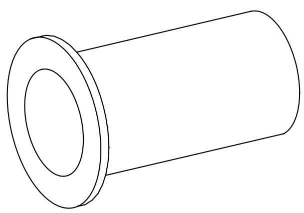
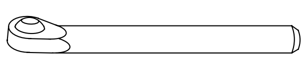
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Bearing, annular ball, lever, augmentor nozzle	 PN 4063876 -C **PN 4063876** **Cobalt Alloy**		Clean per T.O. 2-1-111, SPOP 216. If bearing is seized, work bearing by hand with WD-40, Permatex Penetrating Oil, CRC, or Marvel Mystery Oil prior to cleaning. Refer to T.O. 2-1-111.
Bearing, flanged sleeve, augmentor convergent nozzle	 PN 4076383 -C **PN 4076383** **Graphite Polyimide**		Do not clean
Bearing, plain, rod end, external nozzle	 PN 4071146 –C **PN 4071146** **AMS 5662** **Nickel Base Alloy**		Clean per SPOP 18 in SWP 031 08. After fluorescent penetrant inspection, if part contains integral bearing, reclean per SPOP 18.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

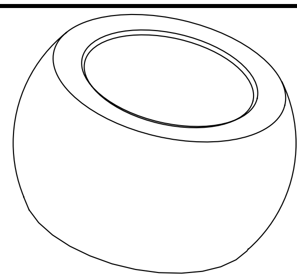
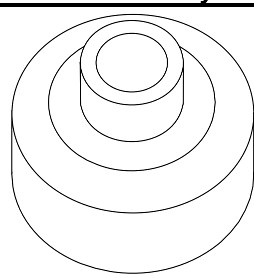
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Bearing, spherical plain, connecting link, rigid, balance nozzle segment	 **PN 4073566 Stellite 3 Cobalt Alloy**	See paragraph 4.	
Bearing, self aligning plain, augmentor nozzle actuator support	 **PN 4048593 AMS 5643 Stainless Steel AMS 5630 Stainless Steel**	See paragraph 4.	

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

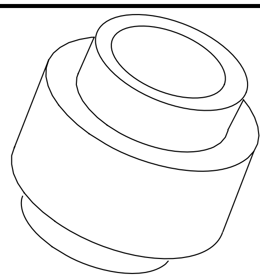
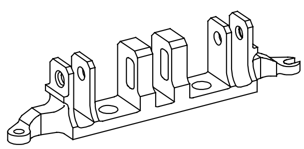
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Bearing, self aligning plain, connecting link, augmentor nozzle synchronizing ring	 PN 4071400 -C **PN 4071400** **Race AMS 5759** **Cobalt Base Alloy**	See paragraph 4.	
Bracket, augmentor divergent nozzle connecting link	 PN 4075771 -C **PN 4075771** **PWA 1267** **Titanium Alloy**		SPOP 9, SWP 031 19 SPOP 18, SWP 031 08 SPOP 8, SWP 031 05

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

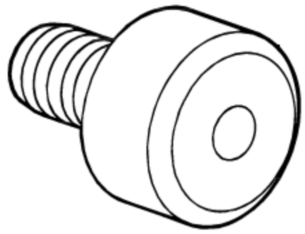
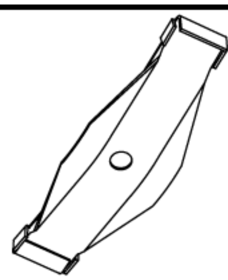
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Cam follower, roller bearing, augmentor nozzle	 PN 4050564 AMS 5845 Stainless Steel	No aluminum oxide lapping compound	Clean per T.O. 2-1-111, SPOP 216. If bearing is seized, work bearing by hand with WD-40, Permatex Penetrating Oil, CRC, or Marvel Mystery Oil prior to cleaning. Refer to T.O. 2-1-111.
Clamp, bridge, augmentor divergent nozzle seal	 PN 4077151 AMS 5596 AMS 5544 Nickel Base Alloy		SPOP 3, SWP 031 01

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

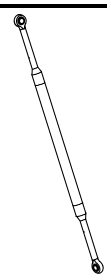
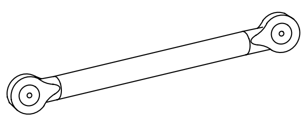
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Connecting link, rigid, augmentor nozzle	 PN 4071755 -C **PN 4071755** **AMS 5662** **Nickel Base Alloy**		Clean per SPOP 18 in SWP 031 08. After fluorescent penetrant inspection, if part contains integral bearing, reclean per SPOP 18.
Connecting link, rigid, augmentor nozzle	 PN 4074709 -C **PN 4074709** **AMS 5662** **Nickel Base Alloy**		Clean per SPOP 18 in SWP 031 08. After fluorescent penetrant inspection, if part contains integral bearing, reclean per SPOP 18.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

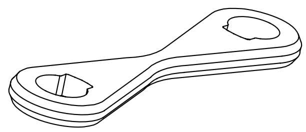
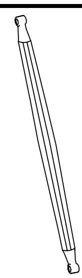
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Connecting link, rigid, balance nozzle segment	 PN 4073565 -C **PN 4073565** **AMS 5663** **PWA 1010** **Nickel Base Alloy**		Clean per SPOP 9 in SWP 031 19 or SPOP 8 in SWP 031 05. After fluorescent penetrant inspection, if part contains integral bearing, reclean per SPOP 18 in SWP 031 08.
Connecting link assembly, rigid, augmentor nozzle	 PN 4070115 –C **PN 4070115-01** **PWA 5544** **Nickel Base Alloy**	Mask ‘‘No-Step’’ painted section	SPOP 9, SWP 031 19 SPOP 8, SWP 031 05

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

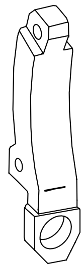
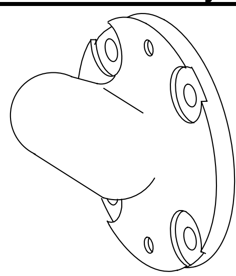
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Connecting link, augmentor nozzle synchronizing ring	 PN 4071329 -C **PN 4071329** **Titanium Alloy**		SPOP 9, SWP 031 19 SPOP 18, SWP 031 08 SPOP 8, SWP 031 05
Cover, finger valve	 PN 4004056 -C **PN 4004056** **AMS 4921** **Titanium Alloy**		SPOP 9, SWP 031 19 SPOP 18, SWP 031 08 SPOP 8, SWP 031 05

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

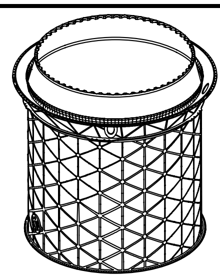
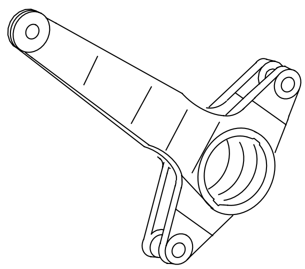
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Duct, augmentor combustion chamber	 PN 4073475 -C **PN 4073475-01 AMS 4911 Titanium Alloy**		SPOP 18, SWP 031 08
Lever, augmentor nozzle	 PN 4074624 -C **PN 4074624 PWA 649-3 Nickel Base Alloy**		Clean per SPOP in SWP 031 08. After fluorescent penetrant inspection, if part contains integral bearing, reclean per SPOP 18.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

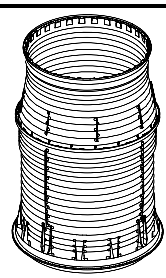
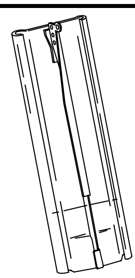
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Liner, augmentor combustion chamber	 PN 4075242 -C **PN 4075242-01** **PN 4079666-01** **PWA 1042** **Cobalt Base Alloy**		SPOP 203, SWP 031 09
Liner, augmentor convergent nozzle segment	 PN 4070107 -C **PN 4070107** **PWA 1095** **Columbium Alloy**		Steam clean only.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

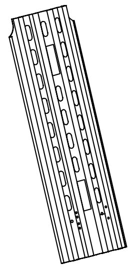
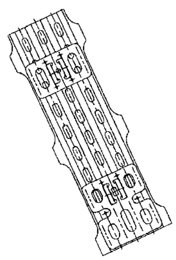
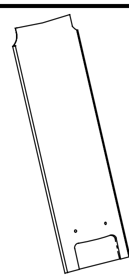
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Liner, augmentor convergent nozzle segment seal non-gaspath facesheet - Brace (disassembled)	 PN 4071134 -C **PN 4071134** **PWA 1165** **Nickel Base Alloy**  PN 4081289 –C **PN 4081289** **PWA 1165** **Nickel Base Alloy**	**NOTE** Steam clean only, if attached to gaspath facesheet. Optional - Steam clean prior to SPOP 9.	SPOP 9, SWP 031 19 or SPOP 209, T.O. 2-1-111 Do not clean facesheet
Liner, convergent segment seal, gaspath	 PN 4078305 –C **PN 4078305** **Columbium Alloy**		Steam clean only.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

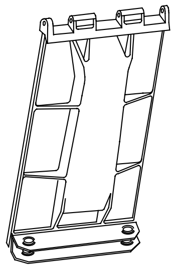
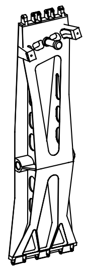
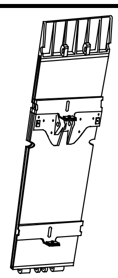
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Nozzle segment, balance, augmentor	 PN 4070067 -C **PN 4070067** **PWA 1267** **Titanium Alloy**	Optional - Steam clean prior to SPOP 9.	Clean per SPOP 9, SWP 031 19 or SPOP 8, SWP 031 05. Mask identification markings.
Nozzle segment, convergent augmentor	 PN 4070741 -C **PN 4070742** **PWA 1267** **Titanium Alloy**	Optional - Steam clean prior to SPOP 9.	Clean per SPOP 9, SWP 031 19. Parts shall be routed to shop for process. Mask identification markings, shoulder pin OD (installed) or hole (removed), and guide OD (installed) or hole (removed) before cleaning.
Nozzle segment, divergent, augmentor	 PN 4071142 -C **PN 4071142**		NOTE Part may be steam cleaned before cleaning. Clean per SPOP 9, SWP 031 19. Mask identification markings and exposed honeycomb. Fluorescent penetrant inspect all attachments and welds on honeycomb section. Refer to T.O. 2J-F100-9.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

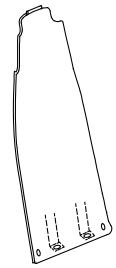
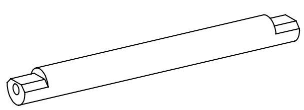
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Nozzle segment, external, augmentor	 PN 4071141 -C **PN 4071141** **PMR-15** **Graphite Polymide** **PWA 1267** **Titanium Alloy**	Do not clean	
Pin assembly, augmentor convergent nozzle segment	 PN 4071726 -C **PN 4071726** **AMS 5662** **Nickel Base Alloy**		Steam clean only.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

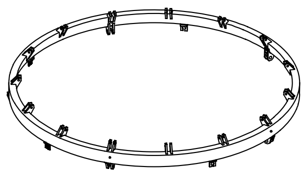
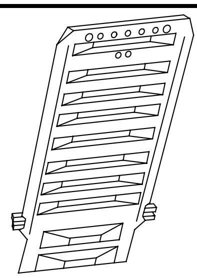
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Ring, synchronizing, augmentor nozzle	 **PN 4074229-01 AMS 4919 PWA 1267 Titanium Alloy**		SPOP 253, WP 041 00. Do not clean coated parts or preserve coating (PWA 474 antigalling compound) with petroleum solvents or compounds. Do not vapor degrease part. Refer to SWP 031 01, SPOP 3. Do not abrasive blast part. Refer to SWP 031 19, SPOP 9 or SPOP 8, SWP 031 05.
Seal, augmentor balance nozzle segment	 **PN 4076954 AMS 5537 AMS 5596 AMS 5633 Wrought Corrosion and Heat Resistant Steels**	Optional - Steam clean prior to SPOP 9.	Clean per SPOP 9, SWP 031 19 or SPOP 8, SWP 031 05. Mask identification markings and exposed honeycomb.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

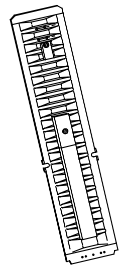
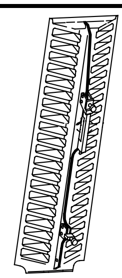
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Seal, augmentor convergent nozzle segment	 PN 4077837 -C **PN 4077837** **AMS 5510** **Steel Alloy** **AMS 5537** **Cobalt Alloy** **AMS 5596,** **AMS 5663,** **AMS 5665** **Nickel Alloy**	Optional - Steam clean prior to SPOP 9.	Clean per SPOP 9, SWP 031 19 or SPOP 8, SWP 031 05. Mask identification markings and exposed honeycomb.
Seal, augmentor divergent nozzle segment	 PN 4072683 -C **PN 4072683** **AMS 5544** **Wrought Corrosion And Heat Resistant Steel**	Optional - Steam clean prior to SPOP 9.	Clean per SPOP 9, SWP 031 19 or SPOP 8, SWP 031 05. Mask identification markings and exposed honeycomb.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

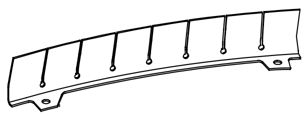
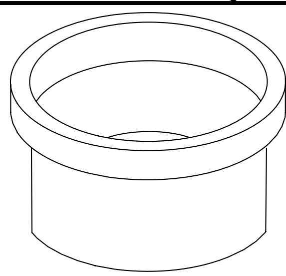
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Seal, augmentor nozzle support	 PN 4071718 -C **PN 4071718** **AMS 4916** **Titanium Alloy**		SPOP 9, SWP 031 19 SPOP 18, SWP 031 08 SPOP 8, SWP 031 05
Seat, helical compression spring	 PN 4011105 -C **PN 4011105** **AMS 4972** **Titanium Alloy**		SPOP 9, SWP 031 19 SPOP 18, SWP 031 08

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

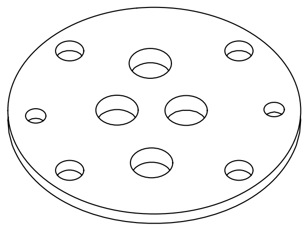
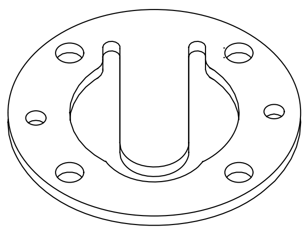
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Spacer, finger valve	 PN 4004057 -C **PN 4004057** **AMS 4921** **Titanium Alloy**		SPOP 9, SWP 031 19 SPOP 18, SWP 031 08 SPOP 8, SWP 031 05
Spring, finger valve	 PN 4004058 -C **PN 4004058** **AMS 4921** **Titanium Alloy**		SPOP 9, SWP 031 19 SPOP 8, SWP 031 05

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

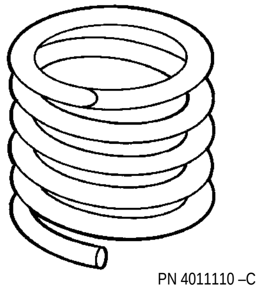
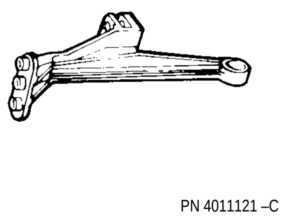
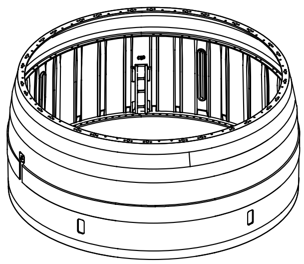
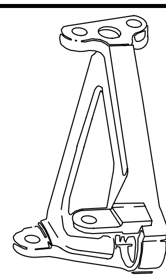
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Spring, helical, actuator compression	 **PN 4011110 AMS 5699 Nickel Base Alloy**		SPOP 9, SWP 031 19 SPOP 8, SWP 031 05
Support, augmentor nozzle actuator	 **PN 4011121 or 4011122 PWA 1262-1 Titanium Alloy**		SPOP 9, SWP 031 19 SPOP 18, SWP 031 08 SPOP 8, SWP 031 05.

Table 1. Augmentor Duct and Nozzle Module Components - Recommended Cleaning Processes and Procedures (continued)

Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
Support, augmentor nozzle	 PN 4071150 -C **PN 4071150** **AMS 4916** **AMS 4973** **Titanium Alloy**		Clean per SPOP 9, SWP 031 19 or SPOP 8, SWP 031 05. Parts shall be routed to shop for process. Mask indentification marking.
Support, augmentor nozzle	 PN 4071122 -C **PN 4071122 OR 4071123** **PWA 1267** **Titanium Alloy**		Clean per SPOP 9, SWP 031 19 or SPOP 8, SWP 031 05. Part shall be routed to shop for process. Mask identification markings before cleaning.

7. FOLLOW-ON MAINTENANCE.

a. Install part on augmentor duct and nozzle module.

WORK PACKAGE

TECHNICAL PROCEDURES

AUGMENTOR NOZZLE ASSEMBLY -

CLEANING

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	0				
4 Blank	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Augmentor Duct and Nozzle Module ----------------	T.O. 2J-F100-53-10
Augmentor Duct and Nozzle Module - Disassembly ------	WP 011 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cleaner, liquid	B & B 3100

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for cleaning the exterior of the augmentor nozzle before inspection or repair.

2. AUGMENTOR NOZZLE ASSEMBLY - CLEANING.

a. Mix two quarts of B & B 3100 liquid cleaner with eight quarts of water.

b. Using a garden sprayer, fire extinguisher or spray cart, spray the outside of the nozzle with the liquid cleaner.

c. Let the solution soak for five minutes, then rinse with clean water.

d. Reapply antigalling compound to parts, as necessary, during assembly.

3. FOLLOW-ON MAINTENANCE.

a. Disassemble augmentor nozzle assembly as necessary.

WORK PACKAGE

INTRODUCTION

AUGMENTOR DUCT AND NOZZLE MODULE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	9				
2	6				
3	9				
4 Blank	0				

1. INTRODUCTION.

This work package introduces the 300 00 through 399 00 series of work packages for the augmentor duct and nozzle module parts - inspection. The following work packages are included in this series.

WORK PACKAGE

TECHNICAL PROCEDURES

INSPECTION -

GENERAL

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	2				
4	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Introduction and General Information	T.O. 2J-F100-53-1
Inspection, Physical, General	WP 071 00
Engine Accessories and Rigging Procedures	T.O. 2J-F100-53-4
Shafts-Flexible, Primary and Secondary Actuator,Convergent Nozzle	WP 042 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains general information applicable to part inspection.

2. INSPECTION INSTRUCTIONS.

a. Instructions contained in inspection work packages supplement judgement and experience a qualified inspector has gained. Correct interpretation of visual defects of wear, scuffing, pitting, etc., is the result of years of experience in the area of engine parts inspection. As a guide, personnel should carefully follow inspection data and rely on good common sense.

3. HARDWARE REQUIRING SCHEDULED INSPECTION. (See Table 1.)

a. Hardware listed in Table 1 requires scheduled inspection.

4. INSPECTION TABLES/FIGURE LEGENDS.

a. Inspection shall be visual unless otherwise specified.

b. Inspection work packages are revised as additional information is obtained as a result of increased service time of engine parts.

c. Figure legends or tables shall be interpreted as follows:

(1) Inspection Area - Condition column. Defines area of part to be inspected and type of damage or wear to be observed. Terms used are defined in T.O. 2-1-111 and in T.O. 2J-F100-53-1, WP 071 00.

(2) Maximum Serviceable Limits column. Defines maximum variation from manufacturer’s new part standard with which part may be returned to service without repair.

(3) Maximum Reparable Limits column. Defines maximum variation from manufacturer’s new part standard for which repair shall then be made. Parts exceeding this limit are not considered reparable.

(4) Corrective Action column. Presents repair or replacement action depending on serviceable and/or reparable limits.

Table 1. Parts Requiring Inspection - Replace as Required

Part Number	Nomenclature	Quantity	WP/SWP
4020265	Convergent Nozzle Secondary Actuator Flexible Shaft	5	042 00 (T.O. 2J-F100-53-4)

d. Example:

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Shroud -			
Cracks	One inch in length	Two inches in length	Weld repair per paragraph 4.

(1) Shroud cracked one inch or less is serviceable and may be returned to service without repair; however, crack may be repaired, if desired, by using activity.

(2) Shroud cracked between one and two inches shall be repaired before part is returned to service. Corrective action column tells how crack shall be repaired.

(3) Cracks exceeding two inches are not reparable.

e. Inspection figures are used to illustrate inspection areas referenced in inspection legends or tables.

WORK PACKAGE

TECHNICAL PROCEDURES

BEARING, AUGMENTOR NOZZLE LEVER -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	9				
3 - 5	0				
6	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Nozzle Segment, Convergent, Augmentor	WP 023 00
Cleaning	WP 201 00
Bearing, Augmentor Nozzle Lever - Repair	WP 402 00
Nozzle Segment, Convergent, Augmentor	WP 601 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instuctions for inspection of the augmentor nozzle lever bearings.

2. PRELIMINARY INSTRUCTIONS.

a. If it is necessary to remove bearings from augmentor nozzle lever for inspection, see instructions in T.O. 2J-F100-53-10, WP 023 00.

3. AUGMENTOR NOZZLE LEVER BALL BEARINGS - INSPECTION.

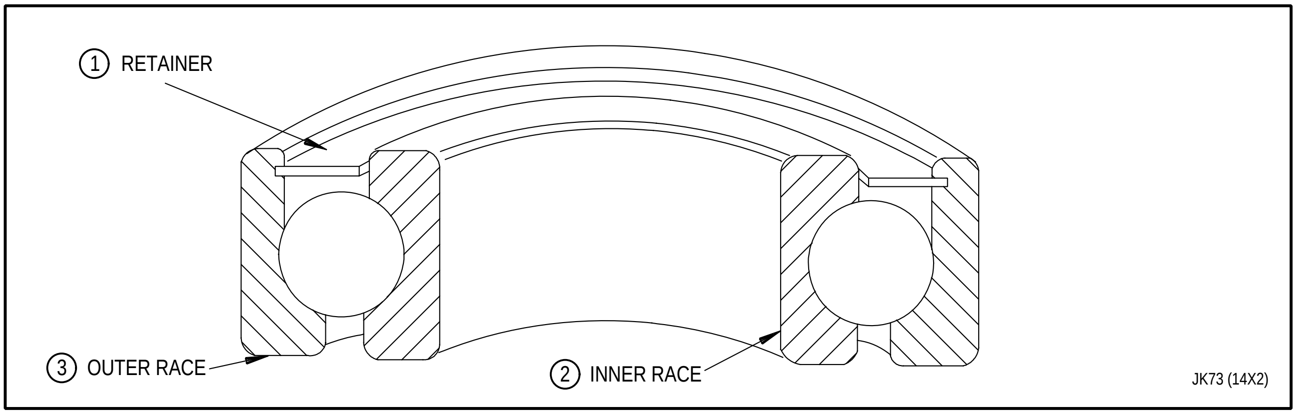
(See Figure 1.)

NOTE

Augmentor nozzle lever bearings function as linkage antifriction pivot bearings only and should not be inspected to same criteria as main engine or accessory rotor bearings per T.O. 2-1-111. A slight amount of drag or roughness is acceptable and will not affect augmentor nozzle operation.

a. Inspect ball bearings for excessive binding or damage per figure 1 while installed in lever (bell crank).

b. Remove bearings only for replacement or further inspection of noted discrepancies.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Retainer -			
Missing, cracked, or pulled out of slot	Not serviceable	Not reparable	Replace bearing.
Dented	Serviceable provided outer edge of retainer can not be seen and bearing rotates within serviceable limits	Not reparable	Replace bearing.

Figure 1. Augmentor Nozzle Lever Ball Bearings - Inspection

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2., 3. Inner and outer races of ball bearing -			
Dents/nicks	To maximum of 0.062 inch on nonfunctional surfaces of races. Sharp edges and raised metal not serviceable	Blending of sharp edges and raised metal to maximum of 0.062 inch depth.	Hand blend to remove sharp corners and raised metal per WP 402 00. Replace bearing exceeding reparable limits.
Cracks	Not serviceable	Not reparable	Replace bearing.
Axial misalignment between inner and outer races	Not serviceable	Any amount provided retainer is not pulled out of its slot and no balls are missing.	Apply hand pressure to realign races. If unsuccessful, lay bearing on flat surface; using light to medium force, strike with rawhide or other soft mallet to realign races. Bearing shall rotate with only slight drag or roughness after realignment and cleaning. Replace bearing if condition cannot be corrected.
Frozen or excessive binding	Not serviceable	Correction by cleaning only	Hand work and clean bearing per T.O. 2J-F100-53-10, WP 201 00. If bearing rotates freely after cleaning, it is serviceable. (See slight drag or roughness condition.) Replace bearing if condition cannot be corrected.
Slight drag or roughness	Serviceable as is	Not required	No corrective action required.

4. FOLLOW-ON MAINTENANCE.

a. If bearings were removed from augmentor nozzle lever, reinstall bearings per WP 601 00.

WORK PACKAGE

TECHNICAL PROCEDURES

LINER, AUGMENTOR COMBUSTION CHAMBER -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 18

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	26	8 - 9	21	16	15
3	16	10 - 14	6	17	16
4 - 7	26	15	16	18 Added	16

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, ANTIGALLING (PWA 36035)	FEL-PRO C-300

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor combustion chamber liner.

2. AUGMENTOR COMBUSTION CHAMBER LINER - INSPECTION.

(See Figure 1.)

a. Visually inspect liner per figure 1.

b. Fluorescent penetrant inspect the liner assembly butt welds of outside diameter per figure 1, Sheet 2. Refer to T.O. 2J-F100-9.

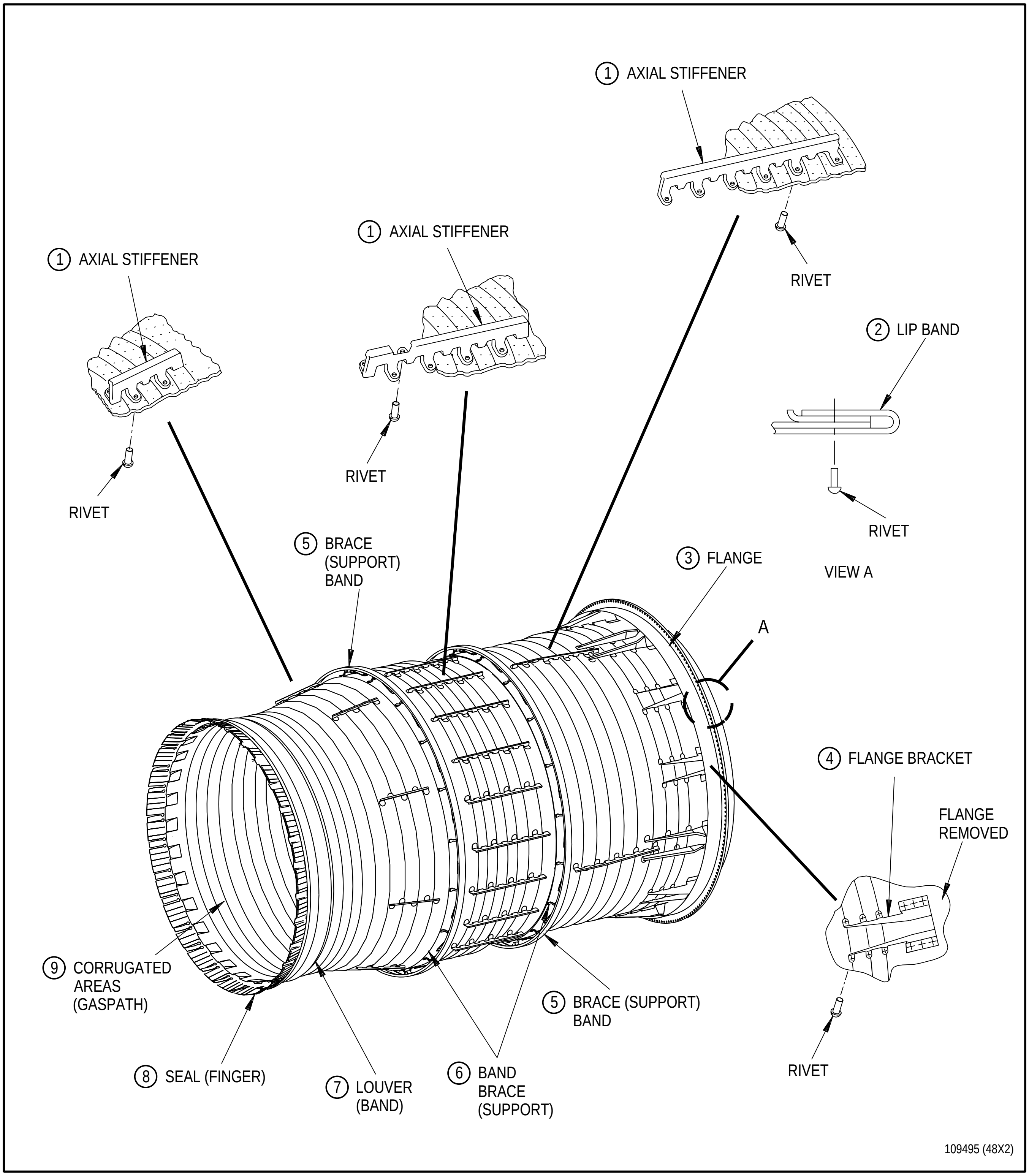


Figure 1. Augmentor Combustion Chamber Liner - Inspection Areas (Sheet 1 of 4)

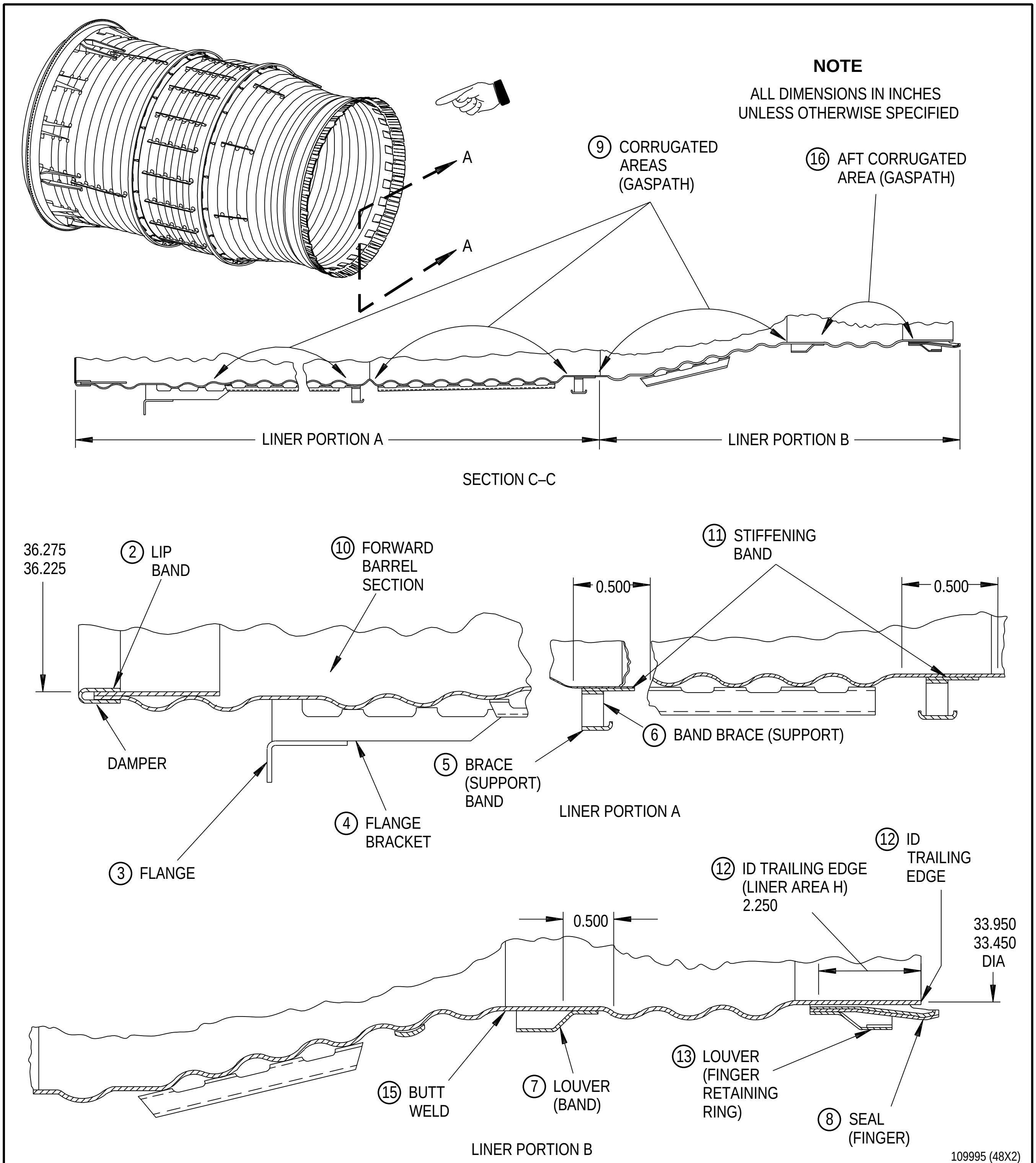


Figure 1. Augmentor Combustion Chamber Liner - Inspection Areas (Sheet 2 of 4)

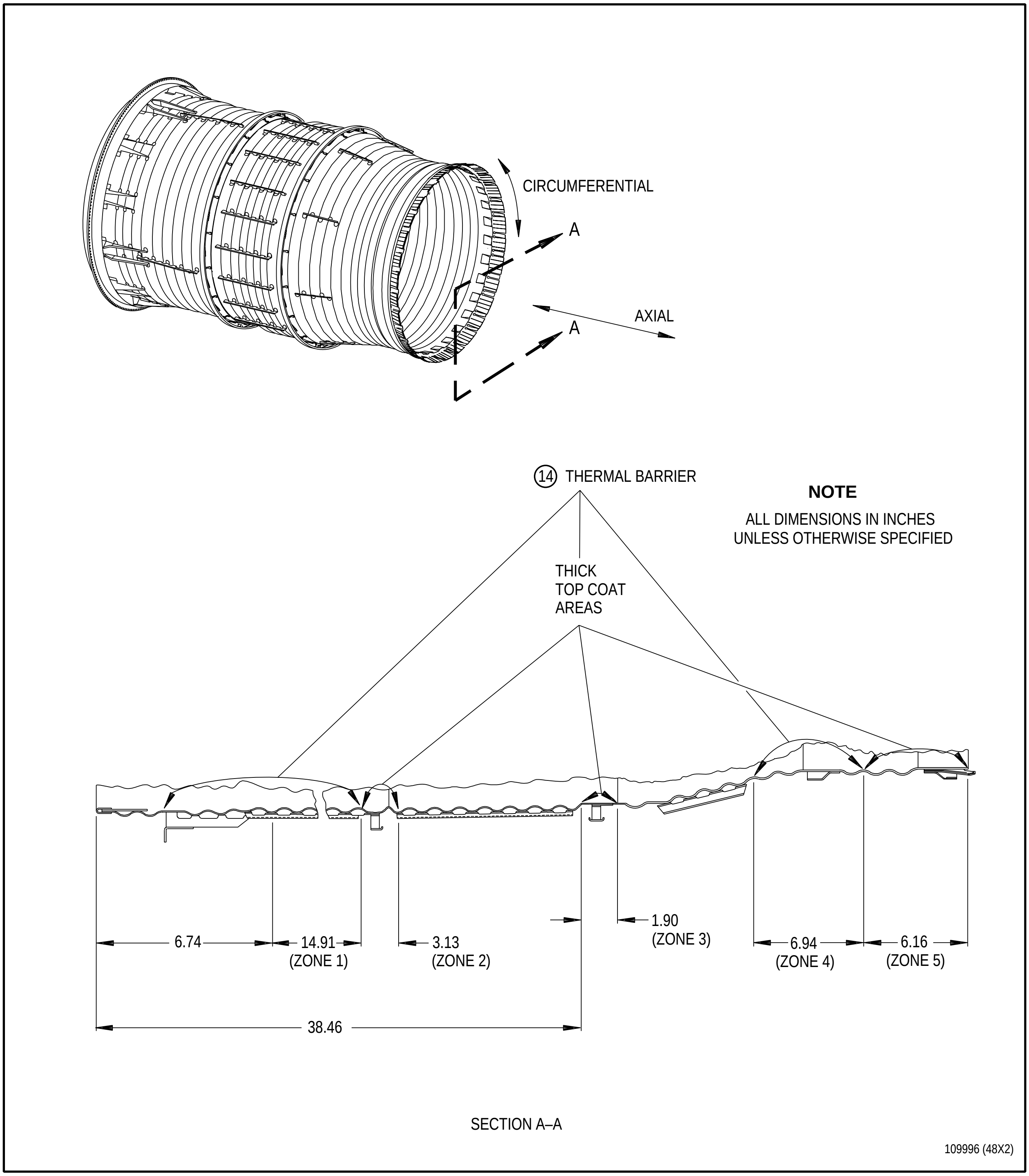
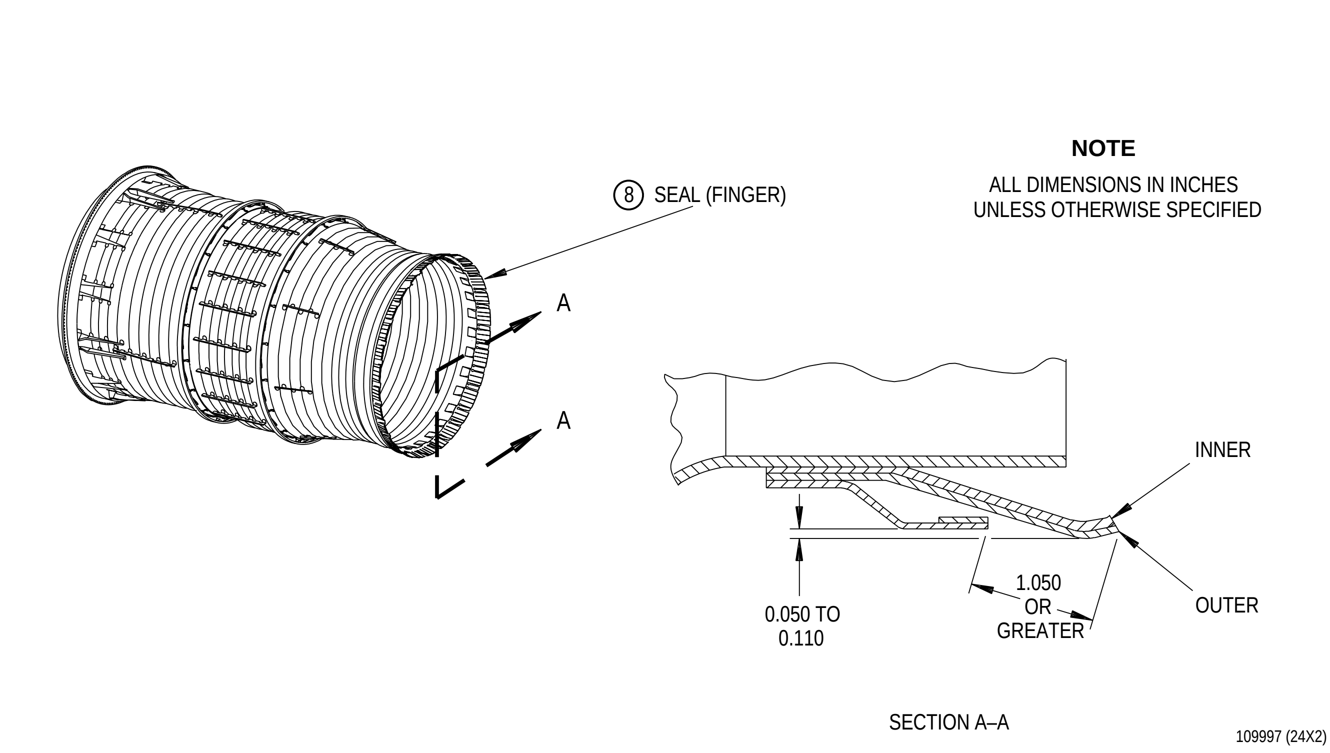


Figure 1. Augmentor Combustion Chamber Liner - Inspection Areas (Sheet 3 of 4)



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Axial stiffeners -			
Cracked	Not serviceable	Not reparable	Replace stiffener per WP 403 00.
Burning	Not serviceable	Not reparable	Replace stiffener per WP 403 00.
Loose rivets	Not serviceable	Not reparable	Replace rivets per WP 403 00.

Figure 1. Augmentor Combustion Chamber Liner - Inspection Areas (Sheet 4 of 4)

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Lip band -			
Radial dents, out-of-round	Diameter must be maintained within 0.400 inch measured in four equally spaced locations(See Sheet 2). Localized dents must not be more than 0.400 inch inward or outward and assembly clearance to Segment II spray ring shall be met. Minimum gap between spray ring and liner ID is 0.050 inch.	Any amount	Recontour to meet serviceable limits.
Axial dents	Dents up to 0.100 inch diameter covering no more than 10 percent of leading edge.	Not reparable	Replace liner.
Loose or missing rivets	Not serviceable	See corrective action.	Replace rivets.
Cracks	Not serviceable	Any number of cracks. Separation between any 2 cracks shall be at least three times the length of the longer crack.	Weld repair per WP 403 00.
3. Flange -			
Cracks	a. Cracks originating from flange bolt holes outward serviceable for maximum of six locations if separated by minimum of five holes.	Not reparable	Replace augmentor liner.
	b. Cracks joining not more than two bolt holes at three locations if locations are not adjacent.	Not reparable	Replace augmentor liner.
	c. Cracks all other areas.	Not reparable	Replace augmentor liner.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Flange - continued			
Waviness	0.800 inch	0.500 inch	Recontour by hand to bring within serviceable limits. Replace augmentor liner if reparable limits are exceeded per WP 403 00.
4. Flange bracket -			
Cracks in rivet pads	Cracks in no more than two rivet pads per bracket, with no more than one on a side.	Not reparable	Replace bracket per WP 403 00.
Loose or missing plates	Not serviceable	Not reparable	Replace missing plates or loose rivets.
5. Brace (support) band -			
Cracks	Not serviceable	Not reparable	Replace liner.
Bent, warped	0.250 inch buckling inward or outward at no more than three locations. No single area of distortion may exceed 5 inches x 5 inches.	0.500 inch warpage inward or outward.	Recontour to serviceable limits. Replace liner exceeding reparable limits.
6. Band brace (support) -			
Cracked braces, separated/ cracked braze joints	Up to four adjoining braces with cracks, separated/cracked braze joints or cracks in previous weld repairs are serviceable provided four adjoining undamaged braces are present on each side of the damaged braces.	Any amount	Repair per WP 403 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
6. Band brace (support) - continued			
Bent, warped	Unlimited amount provided brace warpage is within limits.	Any amount	Straighten braces.
7. Louver (band) -			
Burning (including burnt barrel)	Not serviceable	Any amount reparable by patch not to exceed 50 square inches.	Patch repair per WP 403 00.

NOTE

Corrugated areas are defined as shown in figure 1. For inspection purposes, corrugated areas end 0.500 inch away from outer diameter (OD) circumferential bands (louver(7) and stiffening(11)). Cracks occurring in liner gaspath material adjacent to OD circumferential bands or in corrugated areas should be evaluated per limits for OD circumferential bands (louver(7) and stiffening band(11)).

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Cracks in louver cooling holes (outer diameter or adjacent liner gaspath)	Not serviceable	Up to 8 consecutive cracks and total quatity of cracks not to exceed 20 provided no axial or multiple circumferential cracks	Weld or patch repair per WP 403 00.
8. Seal (finger) -			
Missing seals	Not serviceable	Not reparable	Replace seal assembly per WP 403 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
8. Seal (finger) - continued			
Cracks	Not serviceable	a. One crack per individual seal (finger) less than 1/2 width of seal.	a. Stop drill cracks using 0.060 ±0.005 inch cobalt tip drill. When reparable limits are exceeded, replace seal assembly per WP 403 00.
Burned/eroded	Not serviceable	Any amount provided serviceable limits for wear are maintained.	Repair per WP 403 00. Replace seal assembly per WP 403 00, if reparable limits are exceeded.
Knife-edge trailing edge	Not serviceable	Any amount is reparable provided serviceable limits for wear are maintained.	Repair per WP 403 00. When reparable limits are exceeded, replace seal assembly per WP 403 00.
Bent or kinked	Not serviceable	Not reparable	Replace seal assembly per WP 403 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
8. Seal (finger) - continued			
Wear	Not Serviceable	Not Reparable	Replace seal per WP 403 00.
Radial position	Measure seal radial position per Sheet 4. Outermost edge of each seal shall be 0.050 to 0.110 inch outboard of the OD surface of the aft louver band.	Any amount provided serviceable limit is maintained.	Bend seals as required to meet 0.050 to 0.110 inch dimension.
9. Corrugated areas (gaspath) -			

NOTE

- Corrugated areas are defined as shown in figure 1. For inspection purposes, corrugated areas end 0.500 inch away from outer diameter (OD) circumferential bands(7 and 11). Cracks occurring in liner gaspath material adjacent to OD circumferential bands or in corrugated areas should be evaluated per limits for OD circumferential bands(7 and 11).
- T- or L-shaped cracks are intersecting circumferential and axial (or diagonal) cracks.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Cracks	Not Serviceable	a. Any number of axial, diagonal, circubferential, T- or L-shaped cracks up to 3.000 inches in total length per crack	a. Weld repair per WP 403 00. Replace liner if reparable limits are exceeded.
		b. Areas with cracks over 3.000 inches in length or extensive cracking may be patch repaired provided patch does not exceed 50 square inches.	b. Patch repair per WP 403 00. Replace liner if reparable limits are exceeded.
Thermal distortion, buckling	0.25 inch distortion inward or outward at no more than three locations.	Any amount provided serviceable limits can be met.	Locally recontour distorted area using nonmetallic hammer.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
9. Corrugated areas (gaspath) - continued			
Burning	Not serviceable	Any amount reparable by patch not to exceed 50 square inches.	Patch repair per WP 403 00. Replace liner if reparable limits are exceeded.
10. Forward barrel section -			
Cracks	Not serviceable	a. Any number less than 1.000 inch long. Cracks shall be separated by 8.000 inches.	a. Stop drill cracks with 0.060 to 0.110 inch drill.
		b. Any number over 1.000 inch long. Cracks shall be separated by 8.000 inches.	b. Weld repair per WP 403 00. Replace liner if reparable limits are exceeded.
Dents	Localized dents must not be more than 0.200 inch deep inward or outward.	Any amount unless serviceable limits cannot be met.	Recontour to bring within serviceable limits. Replace liner exceeding serviceable limit.
Burning	Not serviceable	Not reparable	Replace liner.
11. Stiffening band - liner areas			

NOTE

Corrugated areas are defined as shown in figure 1. For inspection purposes, corrugated areas end 0.500 inch away from outer diameter (OD) circumferential bands(7 and 11). Cracks occurring in liner gaspath material adjacent to OD circumferential bands or in corrugated areas should be evaluated per limits for OD circumferential bands(7 and 11).

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Cracks across or adjacent to band	Not serviceable	Not reparable	Weld repair per WP 403 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
11. Stiffening band - liner areas - continued	Unlimited number of cracks under 1.000 inch long are serviceable provided they are separated by 0.500 inch.	See corrective action	Weld repair per WP 403 00.

NOTE

T- or L-shaped cracks are intersecting circumferential and axial (or diagonal) cracks.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
	Not serviceable	a. Any number of axial, or diagonal, cracks less than 2.000 inches. • T- or L-shaped cracks with the sum of the axial (or diagonal) and circumferential length not exceeding 3.0 inches.	a. Weld repair per WP 403 00. Replace liner if reparable limits are exceeded.
		b. Areas with extensive cracking may be patch repaired provided patch does not exceed 50 square inches.	b. Patch repair per WP 403 00. Replace liner if reparable limits are exceeded.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
12. ID trailing edge (Liner Area H) -			
Cracks	Not serviceable	a. Any number of cracks less than 3/4 inch long. Up to five cracks between 3/4 inch and 2.00 inch long, separated from all other cracks by four inches if cracks are circumferential.	a. Stop drill cracks with 0.050 to 0.110 inch drill.
		b. Any number of cracks over the limits in a. above.	b. Weld repair or replace liner segment per WP 403 00.
Burning	Not serviceable	a. Area up to 0.200 inch axially from liner aft edge and 1.00 inch circumferentially may be burnt away locally. Total area not exceeding 7.00 square inches.	a. Blend off all sharp edges.
		b. Area up to 1.00 inch axially from liner aft edge and 1.50 inches circumferentially may be burnt away locally. • Patch cannot exceed 36 square inches in area • Maximum circumferential length is 12.00 inches.	b. Patch repair or replace liner segment per WP 403 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
12. ID trailing edge (Liner Area H) - continued			
Out-of-roundness in Area H at finger seal rivet circle	Aft end inside diameter measured in four equally spaced locations at finger seal attachment rivet circle shall be 33.450 to 33.950 inches.	Not reparable if aft end inside diameter measures less than 32.000 inches or more than 35.400 inches.	Repair per WP 403 00.
Out-of-roundness at trailing edge	Not serviceable	Any amount	Locally recontour distorted area by hand or using nonmetallic hammer.
13. Louver (finger retaining ring)			
Cracks, burning	Not serviceable	Not reparable	Replace ring per WP 403 00.
14. Thermal barrier coating-			

NOTE

- Missing thermal barrier is permitted within 0.250 inch of patch and crack repair weld(s) centerline.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Missing	Zone 1 - Two 1.50 square inch areas separated by at least 2.0 inches. Maximum dimension of each area not to exceed 3.0 inches.	Any amount	Replace thermal barrier coating per WP 403 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
14. Thermal barrier coating- (continued)			
Missing	Zone 2 and 3 - Two 0.375 square inch areas separated by at least 2.0 inches. Maximum dimension of each area not to exceed 0.75 inch.	Any amount	Replace thermal barrier coating per WP 403 00.
Missing	Zone 4 and 5 - Two 1.00 square inch areas separated by at least 2.0 inches. Maximum dimension of each area not to exceed 2.0 inches.	Any amount	Replace thermal barrier coating per WP 403 00.
15. Butt welds (4 places)-			
Cracks	Not serviceable	See corrective action.	Weld repair per WP 403 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
16. Aft corrugated area (gaspath) -			

NOTE

T- or L-shaped cracks are caused by intersecting circumferential and axial (or diagonal) cracks.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Cracks	Not serviceable	a. Any number of axial, diagonal, circumferential, T-, or L-shaped cracks up to 3.00 inches in total length per crack	a. Weld repair or replace liner segment per WP 403 00.
		b. Areas with cracks over 3.00 inches in length or extensive cracking may be patch repaired provided patch does not exceed 50 square inches.	b. Patch repair or replace liner segment per WP 403 00.
Thermal distortion, buckling	0.25 inch distortion inward or outward at no more than three locations	Any amount provided serviceable limits can be met	Locally recontour distorted area using nonmetallic hammer.
Burning	Not serviceable	Any amount reparable by patch not to exceed 50 square inches	Patch repair or replace liner segment per WP 403 00.

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL, AUGMENTOR DIVERGENT NOZZLE SEGMENT -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 14

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	22	5 - 6	9	8 - 11	9
2 - 4	9	7	22	12 Blank	9
4A - 4B Added	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Nondestructive Inspection	T.O. 2J-F100-9
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Seal Assembly, Augmentor Divergent Nozzle Segment - Repair	WP 405 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor divergent nozzle segment seal.

2. AUGMENTOR DIVERGENT NOZZLE SEGMENT SEAL - INSPECTION.
(See Figure 1.)

a. Refer to figure 1 for visual inspection and limits.

b. Fluorescent penetrant inspect. Refer to T.O. 2J-F100-9. No cracks allowed.

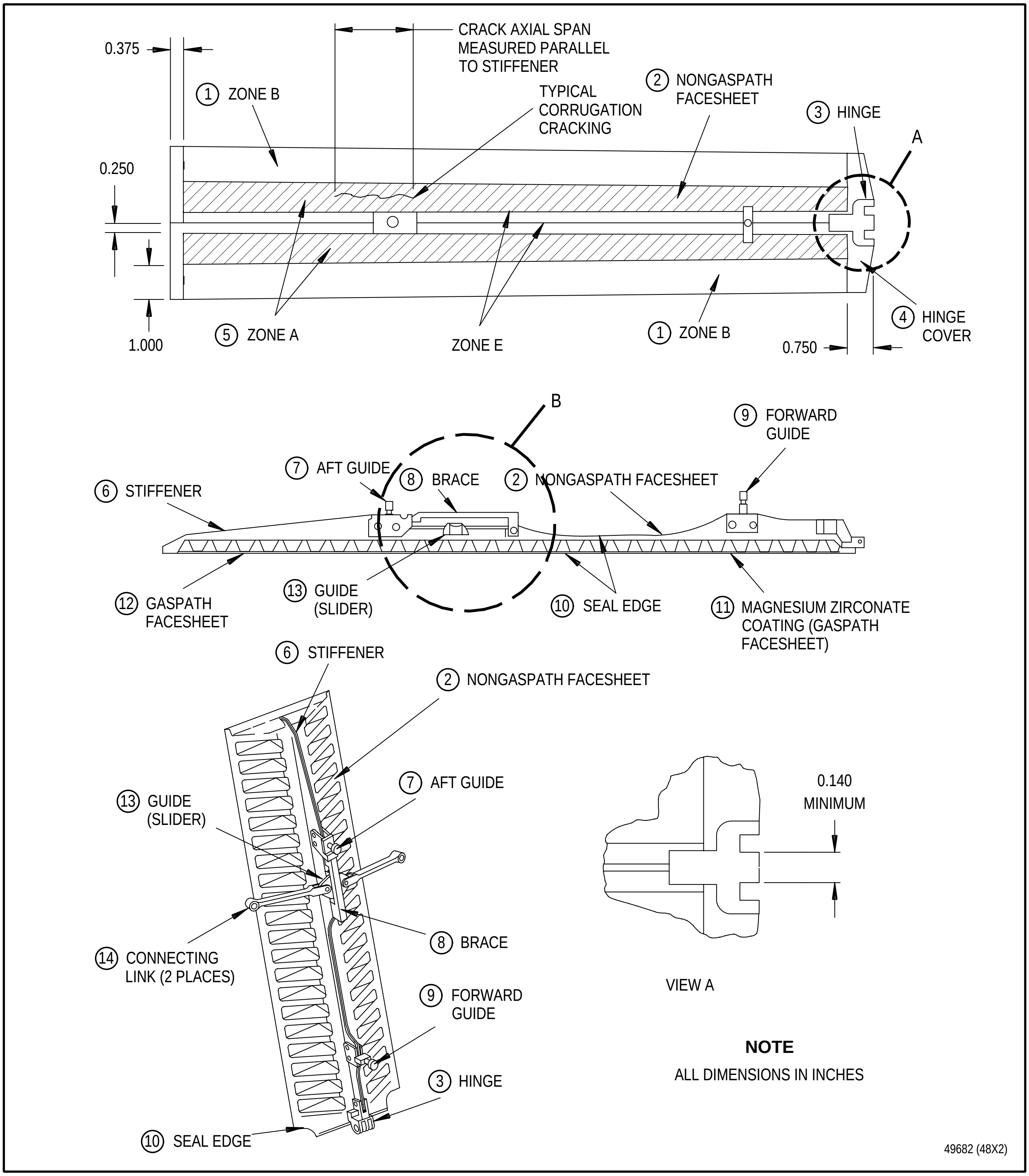


Figure 1. Augmentor Divergent Nozzle Segment Seal - Inspection (Sheet 1 of 3)

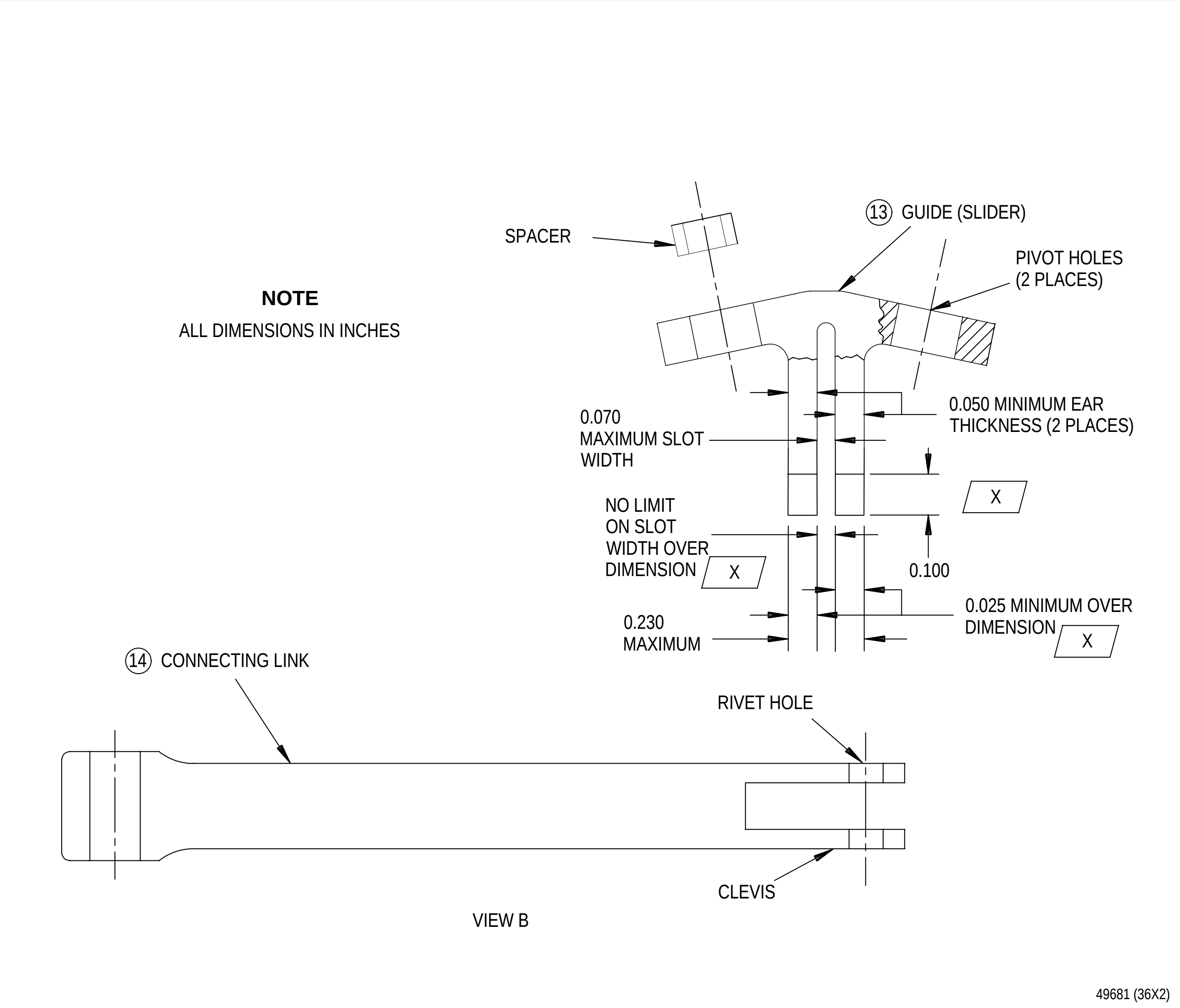


Figure 1. Augmentor Divergent Nozzle Segment Seal - Inspection (Sheet 2 of 3)

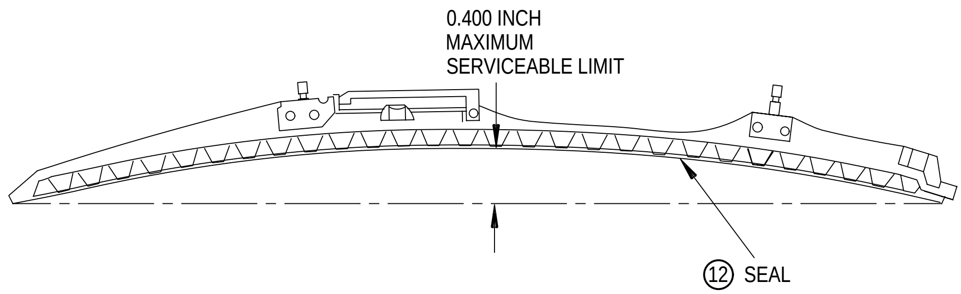


Figure 1. Augmentor Divergent Nozzle Segment Seal - Inspection (Sheet 3 of 3)

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Nongaspath facesheet, Zone B (both sides of backbone) -			
Cracks	Not serviceable	Any amount	Repair per WP 405 00.
Edge wear from divergent segment	Not serviceable	Not reparable	Replace divergent nozzle segment seal.
2. Nongaspath facesheet -			
Punctures, grinding holes adjacent to forward hinge	0.200 inch long, maximum (1 place) provided there is no corresponding damage on gaspath facesheet	Not reparable	Replace divergent nozzle segment seal.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Hinge -			
Loose	Not serviceable	Any amount provided aft hinge rivet hole(1 place) or stiffener rivet hole does not exceed 0.132 inch, or forward hinge rivet hole (2 places) or facesheet rivet holes do not exceed 0.100 inch.	Replace rivet per T.O. 2-1-111. Replace divergent nozzle seal if reparable limits are exceeded.
Hole elongation	Hole diameter not greater than 0.132 inch and hinge wall thickness not less than 0.028 inch.	Not reparable	Replace hinge per WP 405 00.
Side wear	Center ear thickness shall be 0.140 inch minimum	Not reparable	Replace hinge per WP 405 00.
4. Hinge cover -			
Wear	Up to wear through hardcoat	Not reparable	Replace hinge cover per WP 405 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
5. Nongaspath facesheet Zone A (both sides of backbone) -			
Cracks	Not serviceable	Not reparable	Replace divergent nozzle segment seal.
Missing material (stop drill holes not applicable)	Not serviceable	Not reparable	Replace divergent nozzle segment seal.
Contact wear from divergent segment	Not serviceable	Not reparable	Replace divergent nozzle segment seal.
6. Stiffener -			
Wear from guide	0.028 inch minimum material thickness	Any amount	Plasma spray, puddle weld, or patch repair per WP 405 00.
Cracks and tears	Not serviceable	Not reparable	Replace divergent nozzle segment seal.

NOTE

Stop drill holes for crack(s) in Zone E are not to be counted as punctures.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Punctures on either side of stiffener, Zone E	Serviceable provide puncture is not greater than 0.200 inch long or 0.100 inch wide, one puncture maximum	Not reparable	Replace divergent nozzle segment seal.
Cracks adjacent to stiffener Zone E	Not serviceable	a. One crack per side of stiffener, length of single crack shall not exceed 0.125 inch.	a. Stop drill crack per WP 405 00.
		b. Reparable provided crack does not run perpendicular to seal stiffener and maximum crack mismatch not to exceed 300 percent in free state.	b. Weld repair per WP 405 00. Replace divergent nozzle segment seal exceeding reparable limits. See QRSL WP 606 00.

Legend for figure 1 (continued)

Inspection Area - Condition		Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
7., 9.	Forward/Aft guides -			
	Stud missing or damaged threads	Not serviceable	Not reparable	Replace guides per WP 405 00.
	Loose or retaining rivet missing	Not serviceable	Any amount provided guide or stiffener rivet holes do not exceed0.165 inch	Replace rivet per T.O. 2-1-111. Replace divergent nozzle seal if reparable limits are exceeded.
8.	Brace -			
	Cracked/ missing	Not serviceable	Not reparable	Replace brace, per WP 405 00.
	Loose or retaining rivet missing	Not serviceable	Any amount provided brace or stiffener rivet holes do not exceed0.132 inch	Replace rivet per T.O. 2-1-111. Replace divergent nozzle seal if reparable limits are exceeded.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
10. Seal edge -			
Nicks, tears	Not serviceable	Depth of blend shall not exceed 0.100 inch	Blend nicks and tears using a minimum radius of 0.250 inch. Replace divergent nozzle segment seal if reparable limits are exceeded.
11. Magnesium zirconate coating -			
Missing/worn through	Not serviceable	Any amount	Replace coating per WP 405 00.
12. Gaspath facesheet -			
Cracks	Not serviceable	Total crack length not to exceed 10.0 inches.	Weld repair per WP 405 00. Replace divergent nozzle segment seal exceeding reparable limits.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
12. Gaspath facesheet - (continued)			
Dents	Serviceable	Not applicable	Not applicable
Missing material (stop drill holes are not applicable)	Not serviceable	Not reparable	Replace divergent nozzle segment seal.
Axial warpage	Axial warpage to be measured by placing straight edge along gaspath facesheet, or placing on flat surface with total gap between leading edge and trailing edge not to exceed 0.400 inch	0.400 inch maximum	Repair per WP 405 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
13. Guide (slider) -			
Spread, measured across outside edges	0.230 inch maximum	Not reparable	Replace guide per WP 405 00.
Slot wear and ear thinning, measured from slot root to boundary of dimension X	0.050 inch minimum ear thickness	Not reparable	Replace guide per WP 405 00.
Slot width measured from root to boundary of dimension X	0.070 inch maximum slot width	Not reparable	Replace guide per WP 405 00.
Ear thickness over dimension X	0.025 inch minimum. Unlimited slot width over dimension X.	Not reparable	Replace guide per WP 405 00.
Link pivot hole wear	0.180 inch diameter, maximum	Not reparable	Replace guide per WP 405 00.
14. Connecting link -			
Guide pivot wear	0.050 inch maximum radial play provided rivet cannot be turned by hand. 0.030 inch maximum radial play if loose rivet can be turned by hand.	Not reparable	Replace connecting link per WP 405 00.
Clevis wear	0.030 inch minimum thickness each ear, 4 places total	Not reparable	Replace connecting link per WP 405 00.
Rivet hole wear	0.100 inch diameter, maximum	Not reparable	Replace connecting link per WP 405 00.
Spacer wear	None	Not reparable	Replace spacer per WP 405 00.

WORK PACKAGE

TECHNICAL PROCEDURES

CLAMP, BRIDGE, AUGMENTOR DIVERGENT NOZZLE SEAL -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	9				
2	1				
3 - 4	0				
5	9				
6 Blank	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

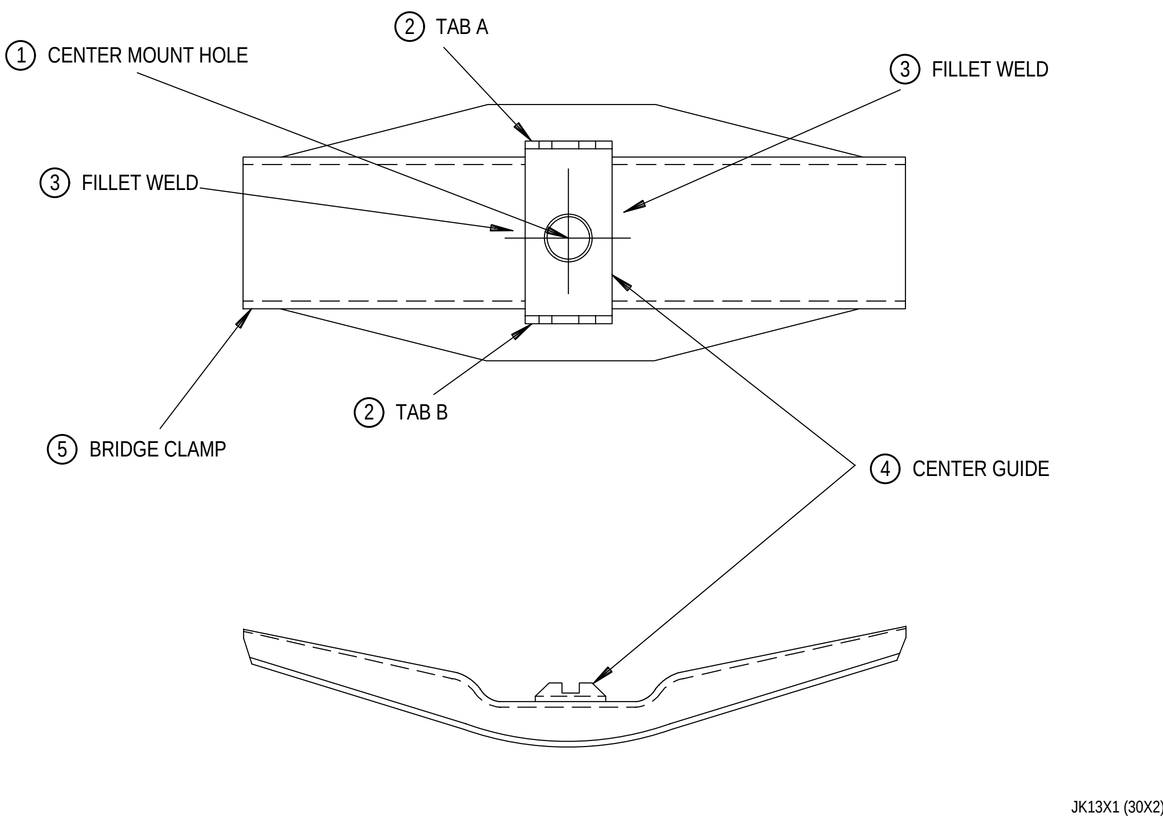
1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor divergent nozzle seal bridge clamps.

2. AUGMENTOR DIVERGENT NOZZLE SEAL BRIDGE CLAMP - INSPECTION.
(See Figure 1.)

a. Fluorescent penetrant inspect per T.O. 2J-F100-9.

b. Visually inspect clamp. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Center mount hole -			
Visible hole elongation	Not serviceable	Not reparable	Replace bridge clamp.

Figure 1. Augmentor Divergent Nozzle Seal Bridge Clamp - Inspection

Table 1. Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Tabs -			
Missing	Not serviceable	Not reparable	Replace bridge clamp.
Cracks	Not serviceable	Not reparable	Replace bridge clamp.
Surface cracks	Not serviceable	Not reparable	Replace bridge clamp.
3. Center guide to bridge clamp welds (2 places)			
Cracks around welds	Not serviceable	Not reparable	Replace bridge clamp.
4. Center guide -			
Misaligned	View part as in bottom view of figure 1. Visually inspect to ensure center guide is not bent toward either side. Any bending of guide toward either side of bridge clamp that will cause bridge clamp to rest unevenly on divergent seal makes part not serviceable.	Not reparable	Replace bridge clamp.
5. Bridge clamp -			
Galled or missing hardface	Not serviceable	Not reparable	Replace bridge clamp.

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL, AUGMENTOR CONVERGENT NOZZLE SEGMENT -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 8	9				
9 Added	9				
10 Blank Added	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures ------------------	T.O. 2-1-111
Nondestructive Inspection ----------------------	T.O. 2J-F100-9
Introduction and General Information ---------------	T.O. 2J-F100-53-1
General Inspection Procedures - Inspection, Physical, General --------------------------------	WP 071 00
Augmentor Duct and Nozzle Module -----------------	T.O. 2J-F100-53-10
Seal Assembly, Augmentor Convergent Nozzle Segment - Repair ---------------------------------	WP 407 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor convergent nozzle segment seal.

2. AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL - INSPECTION.

(See Figure 1.)

a. Refer to figure 1 for visual inspection and limits.

b. Refer to T.O. 2J-F100-53-1, WP 071 00 for general inspection requirements.

c. Cycle mark part per this work package prior to inspection. Seals with 2150 cycles must be replaced. After cycle marking, fluorescent penetrant inspect. Refer to T.O. 2J-F100-9.

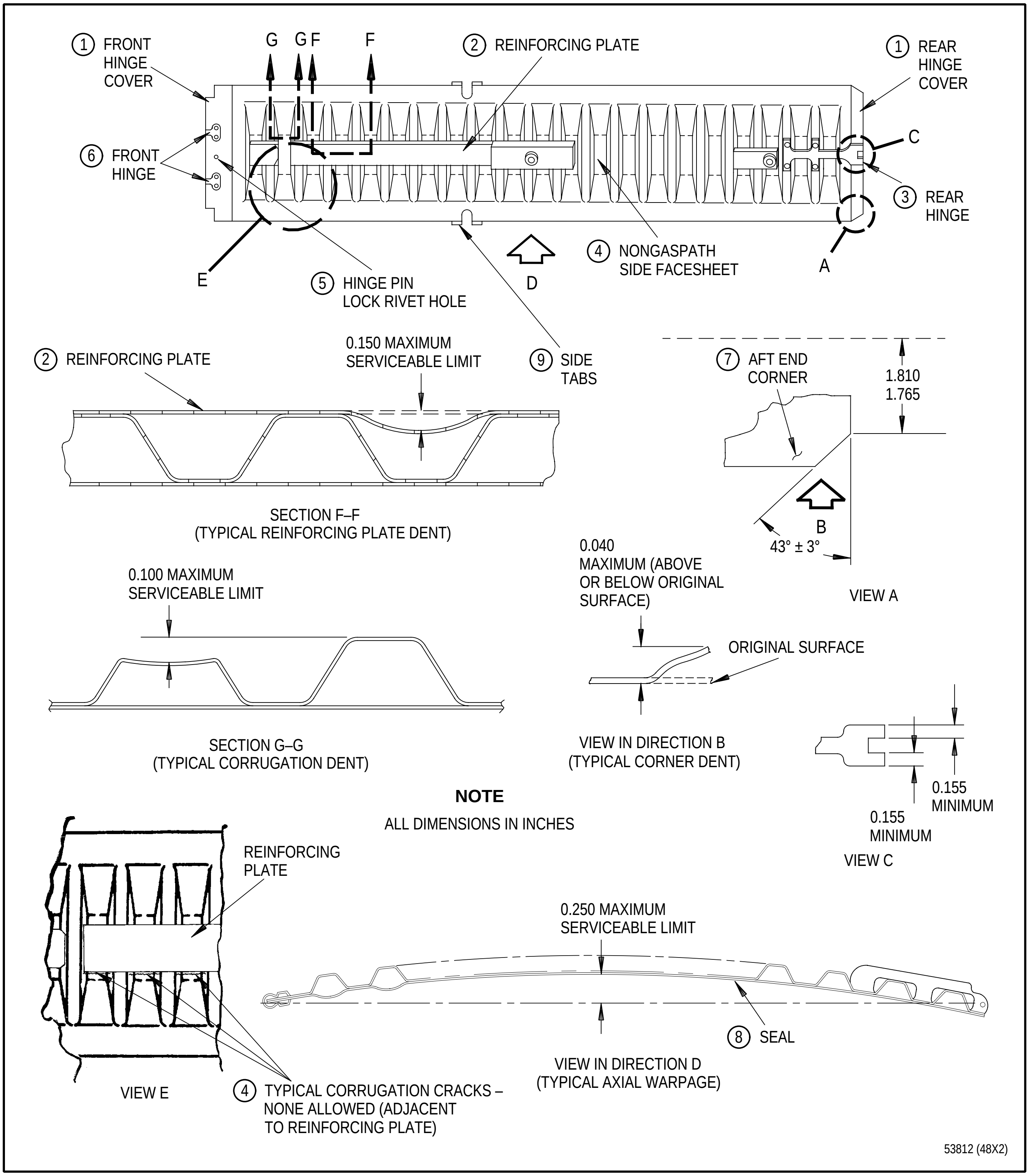


Figure 1. Augmentor Convergent Nozzle Segment Seal - Inspection

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Front and rear hinge covers (gaspath side) -			
Cracks	Not serviceable	Not reparable	Replace hinge cover per WP 407 00.
Wear (rear hinge covers)	0.005 inch minimum material thickness	Not reparable	Replace hinge cover exceeding serviceable limits per WP 407 00.
2. Reinforcing plate (nongaspath side) -			
Cracks	Not serviceable	Any amount	Repair plate per WP 407 00.
Dents or bends	Dents less than 0.150 inch below original surface with no cracks	Dents less than 0.150 inch and all bent bands are reparable	Repair plate per WP 407 00.
3. Rear hinge -			
Pin hole wear	Hole diameter shall not exceed 0.132 inch. Thickness of material around hole shall not be less than 0.035 inch.	Not reparable	Replace hinge per WP 407 00.
Side wear	Each ear shall have minimum 0.155 inch thickness	Not reparable	Replace hinge per WP 407 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Nongaspath side facesheet -			
Wear due to contact with augmentor convergent nozzle segment	Not Serviceable	0.020 inch minimum facesheet thickness	Replace plasma coat per WP 407 00.
Dents in corrugation from contact with augmentor nozzle synchronizing ring connecting link	Dents up to 0.100 inch below adjacent corrugation with no tears or punctures through facesheet	Not reparable	Replace segment seal assembly.
Corrugation axial cracks	Not Serviceable	Not reparable	Replace segment seal assembly.
5. Hinge pin lock rivet hole -			
Cracks	Not Serviceable	0.250 inch maximum length	Weld repair per WP 407 00.
Wear (from grinding to remove pin)	Thickness of material around hole shall not be less than 0.010 inch.	Any amount	Weld repair per WP 407 00.
Elongation	Hole diameter shall not exceed 0.132 inch	Any amount provided maximum hole diameter is less than 0.152 inch.	Weld repair per WP 407 00.
6. Front hinge -			
Pin hole wear	Hole diameter shall not exceed 0.110 inch. Thickness of material around hole shall not be less than 0.035 inch.	Not reparable	Replace hinge per WP 407 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
6. Front hinge - (continued)			
Rivet head wear, gouge	Not serviceable	Not reparable	Replace rivet
7. Aft end corner -			
Dents from contact with segment liner hinge	Dents up to 0.040 inch above or below original flat surface and within an area 0.040 inch from side edge and 0.400 inch from aft edge are serviceable.	See figure 1, View A.	Repair per WP 407 00.
8. Seal -			
Axial warpage	An axial bow of 0.250 inch measured along centerline	An axial bow of 0.500 inch measured along centerline	Straighten by cold working to less than 0.125 inch bow per WP 407 00.
9. Side tabs -			
Loose or missing	Not serviceable	Not Reparable	Replace segment seal assembly

3. CYCLE MARKING

(See Figure 2.)

a. The augmentor convergent nozzle segment seals must be cycle marked after removal to indicate part operating cycles. Mark the seals per the schedule shown in Table 1. Viberpeen symbols. Refer to T.O. 2-1-111 in the area shown in figure 2.

CAUTION

To avoid parts cracking, which will lead to nozzle burnthrough, parts should not be installed in lower cycle augmentor modules to avoid having parts operate beyond serviceable limit.

NOTE

All parts with 2150 cycles shall be replaced.

Table 1. Cycle Marking Codes

SYMBOL	CYCLES	SYMBOL	CYCLES
	0 NEW	[B]	1800 TO 2000
T	UNKNOWN	C	2000 TO 2200
A	0 TO 200	C̲	2200 TO 2400
A̲	200 TO 400	|C̲	2400 TO 2600
|A̲	400 TO 600	|C̲|	2600 TO 2800
|A̲|	600 TO 800	[C]	2800 TO 3000
[A]	800 TO 1000	D	3000 TO 3200
B	1000 TO 1200	D̲	3200 TO 3400
B̲	1200 TO 1400	|D̲	3400 TO 3600
|B̲	1400 TO 1600	|D̲|	3600 TO 3800
|B̲|	1600 TO 1800	[D]	3800 TO 4000

CONTINUE IN LIKE MANNER WITH E, F, G, ... AS REQUIRED

52323 (24X2)

b. Examples of symbols marked on parts:

B = 1200 TO 1400 CYCLES. THIS PART HAD BEEN A NEW SPARE.

|A| B = 1200 TO 1400 CYCLES. THIS PART HAD BEEN PREVIOUSLY MARKED AT THE 600 TO 800 CYCLE PERIOD.

T B |C = AT LEAST 2400 TO 2600 CYCLES. THIS PART HAD BEEN A USED, SERVICEABLE PART OF UNKNOWN CYCLES WHEN FIRST INSTALLED. IT HAD ALSO BEEN REMOVED AND MARKED AT THE 1200 TO 1400 CYCLE PERIOD.

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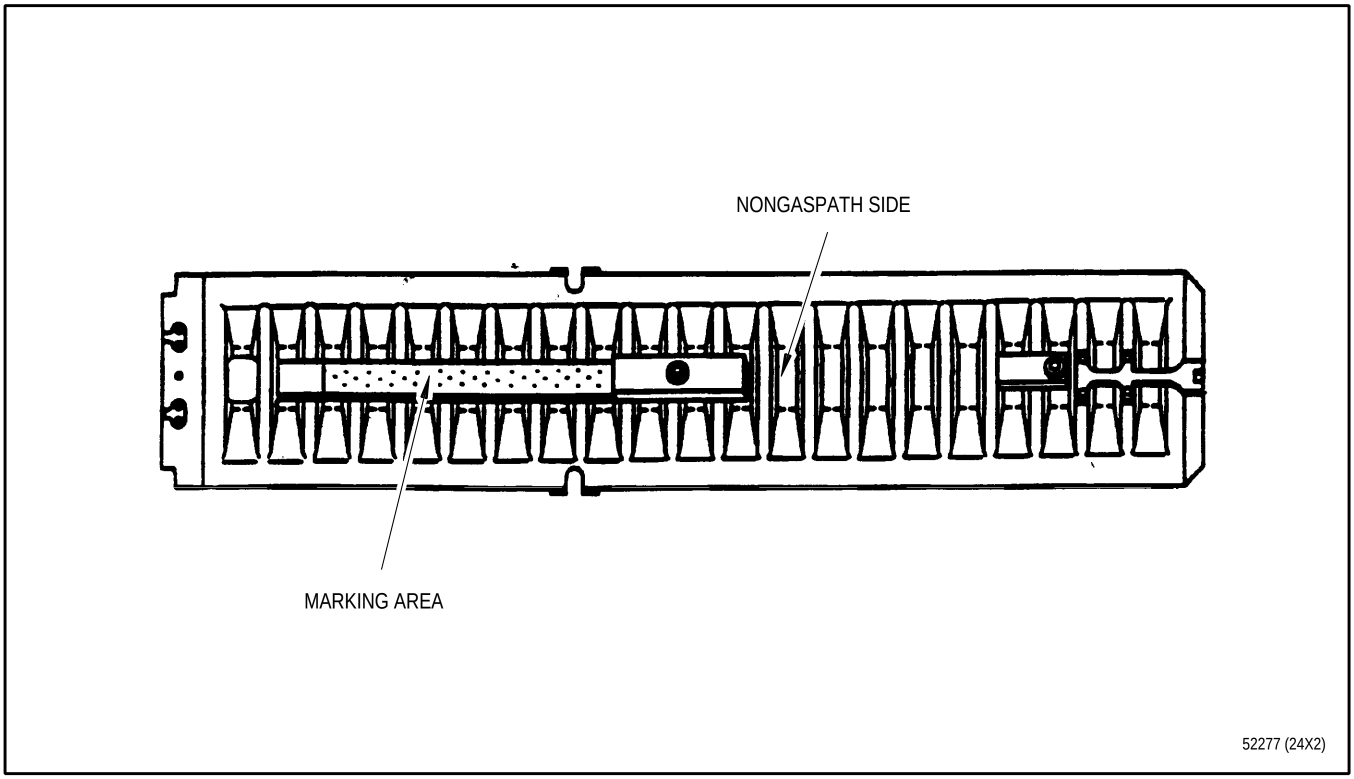


Figure 2. Augmentor Convergent Nozzle Seal Assembly - Cycle Marking

WORK PACKAGE

TECHNICAL PROCEDURES

LINER, AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

This Work Package Supersedes WP 308 00 Through and Including Change 9.

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 12

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 12	17				

REFERENCE MATERIAL REQUIRED

Title	Number
Introduction and General Information	T.O. 2J-F100-53-1
Inspection, Fluorescent Penetrant, General	WP 073 00
Qualified Repair Source Listing (QRSL)	WP 606 00
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Liner, Augmentor Convergent Nozzle Segment Seal - Repair	WP 408 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for unscheduled inspection of augmentor convergent nozzle segment seal liner.

2. AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL LINER - INSPECTION.

(See Figure 1.)

a. Refer to figure 1 for visual inspection and limits.

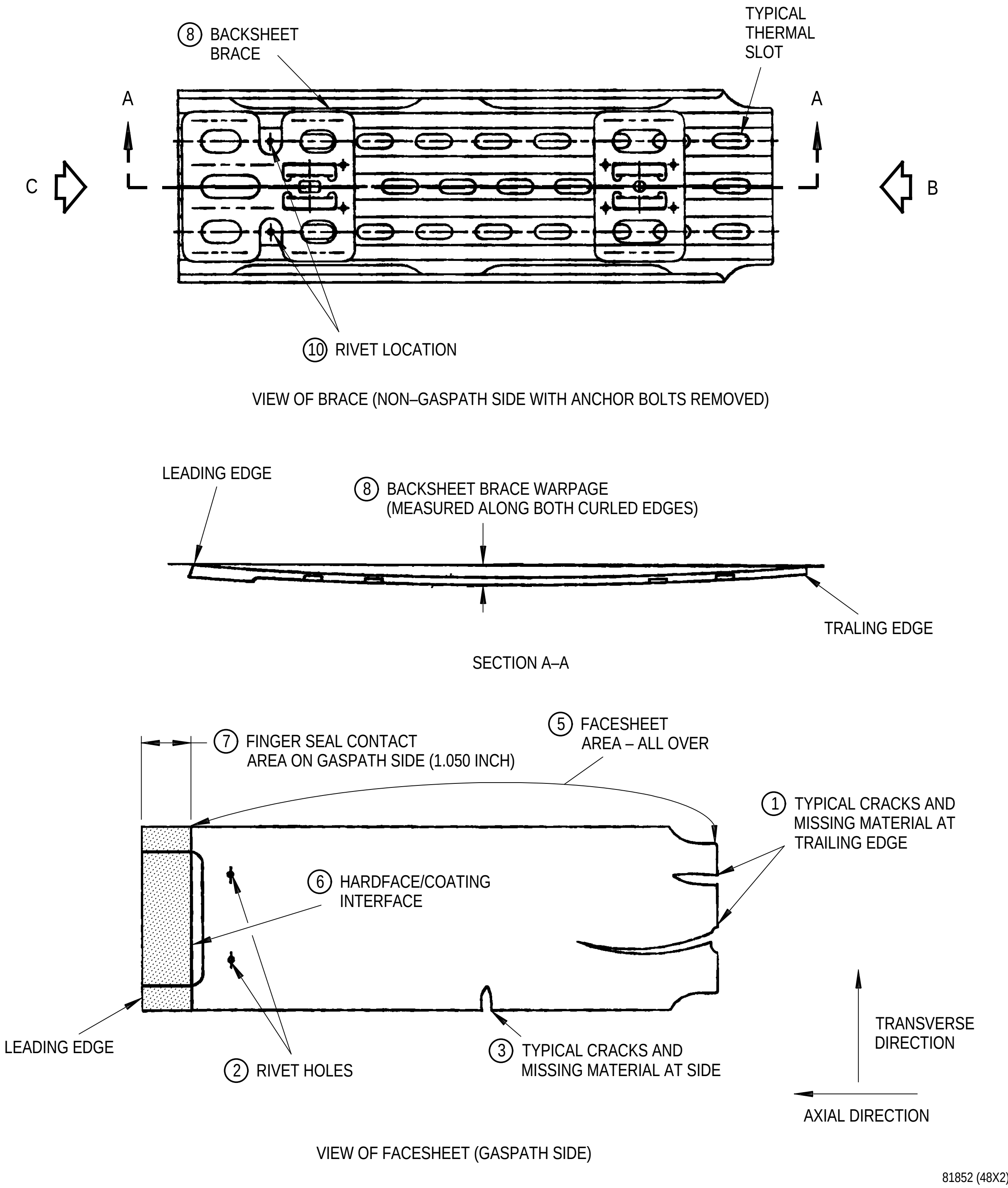


Figure 1. Augmento Convergent Nozzle Segment Seal Liner - Inspection (Sheet 1 of 2)

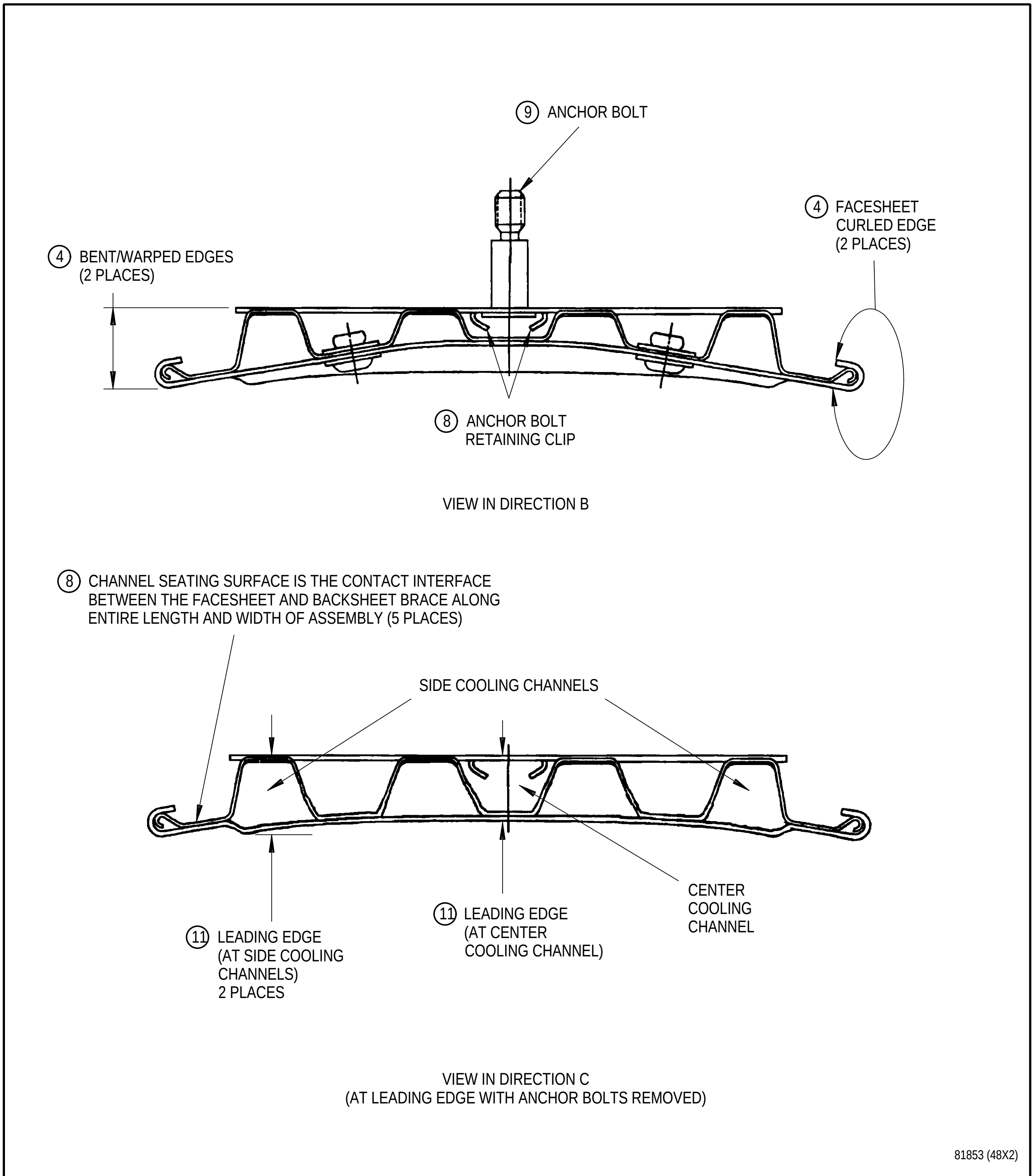


Figure 1. Augmentor Convergent Nozzle Segment Seal Liner - Inspection (Sheet 2 of 2)

Legend for figure 1

CAUTION

To prevent damage to silicide coating on segment seal liner, handle and inspect seal liner with care.

NOTE

Material erosion is detectable by a white or gray layer of oxidized material across edge of eroded area.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Facesheet at trailing edge-			
Cracks, erosion, missing material (JGDFGAA)	0.075 inch axially deep along trailing edge provided maximum length of each area does not exceed 0.250 inch transverse and there is no evidence of erosion.	a. If axial length does not exceed 0.500 inch, any amount is reparable. b. For axial length greater than 0.500 inch but less than 3.00 inch, maximum of one location can be repaired provided width of crack or missing material is not greater than 0.100 inch.	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
2. Facesheet rivet holes-			
Erosion, cracks, or elongation (JGDFGAD)	Not serviceable	Maximum length and/or width does not exceed 0.450 inch	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Facesheet sides-			
Cracks and/or missing material (JGDFGAA)	Not serviceable	Maximum of two areas along each side of assembly provided length and/or width of each area does not exceed 0.375 inch	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
4. Facesheet curled edges-			
Dents	0.030 inch deep by 0.005 inch high for a maximum area of 0.100 square inches (both sides)	Any amount	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Wrinkles	0.005 inch height provided it blends with adjacent surface without sharp creasing of material.	0.050 inch	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Bent or warped	0.650 inch	Any amount	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
5. Facesheet (all over)-			
Missing or chipped coating (JGDFGAC)	Not serviceable	Any amount	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Worn or missing material (JGDFGAA)	Any amount serviceable provided not through facesheet.	Maximum of four areas through parent material provided length and/or width of each area does not exceed 0.375 inch.	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
6. Hardface/ coating interface-			
Chipped or missing coating (JGDFGAE)	Maximum quantity of 2 locations. Maximum area per imperfection is 0.020 square inches, which is equivalent to a 0.140 inch by 0.140 inch area.	Any amount	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
7. Facesheet finger seal contact area-			
Wear through parent material (JGDFGAA)	Not serviceable	Any amount	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Chipped, cracked, or missing hardcoat (JGDFGAB)	Maximum quantity of 2 locations. Maximum area per imperfection is 0.020 square inches, which is equivalent to a 0.140 inch by 0.140 inch area.	Any amount	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
8. Backsheet brace-			
Warpage	Axial bow of 0.200 inch measured along centerline.	Any amount	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Cracks	0.500 inch long provided: - Crack does not start at trailing edge and end at thermal slot - Crack does not extend beyond any stop drilled hole - Crack is not through more than two adjacent thermal slots - Crack is not aligned with a transverse crack or missing material in liner segment	1.250 inch long provided: - Crack does not start at trailing edge and end at thermal slot - Crack is not through more than two adjacent thermal slots	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Dents (all over)	0.100 inch deep around channels.	0.200 inch deep	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
8. Backsheet brace - (continued)			
Protrusions on channel seating surfaces (Facesheet mating surfaces)	0.030 inch when flattened with hand pressure	Any amount	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Missing or deformed anchor bolt retaining clip	Not serviceable (Anchor bolt will not fit/function)	Reparable provided the clips are not torn or missing and no cracks exist.	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
9. Anchor bolts -			
Any damage (bent wings, bad threads, sheared shaft, etc.) (JGDFGAB)	Not serviceable	Not reparable	Replace anchor bolt per WP 408 00.
10. Rivets -			
Loose	Not serviceable	Not reparable	Replace rivet per WP 408 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action

NOTE

- Leading edge dimension is measured by placing part on flat surface, gaspath facesheet up.
- Hand pressure is required to flatten out any axial warpage which will affect measurements.
- Height is measured from flat surface to leading edge of forward lip (edge).

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
11. Leading edge -			
Bent center cooling channel	0.275 inch minimum height.	Replace part and send to repair source	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Bent side cooling channels	0.305 inch minimum height.	Replace part and send to repair source	Repair per WP 408 00. Forward reparable assemblies to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL, AUGMENTOR BALANCE NOZZLE SEGMENT -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

THIS WORK PACKAGE SUPERSEDES WP 309 00 THROUGH AND INCLUDING CHANGE 7

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 8	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Nondestructive Inspection	T.O. 2J-F100-9
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Seal, Augmentor Balance Nozzle Segment - Repair	WP 409 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

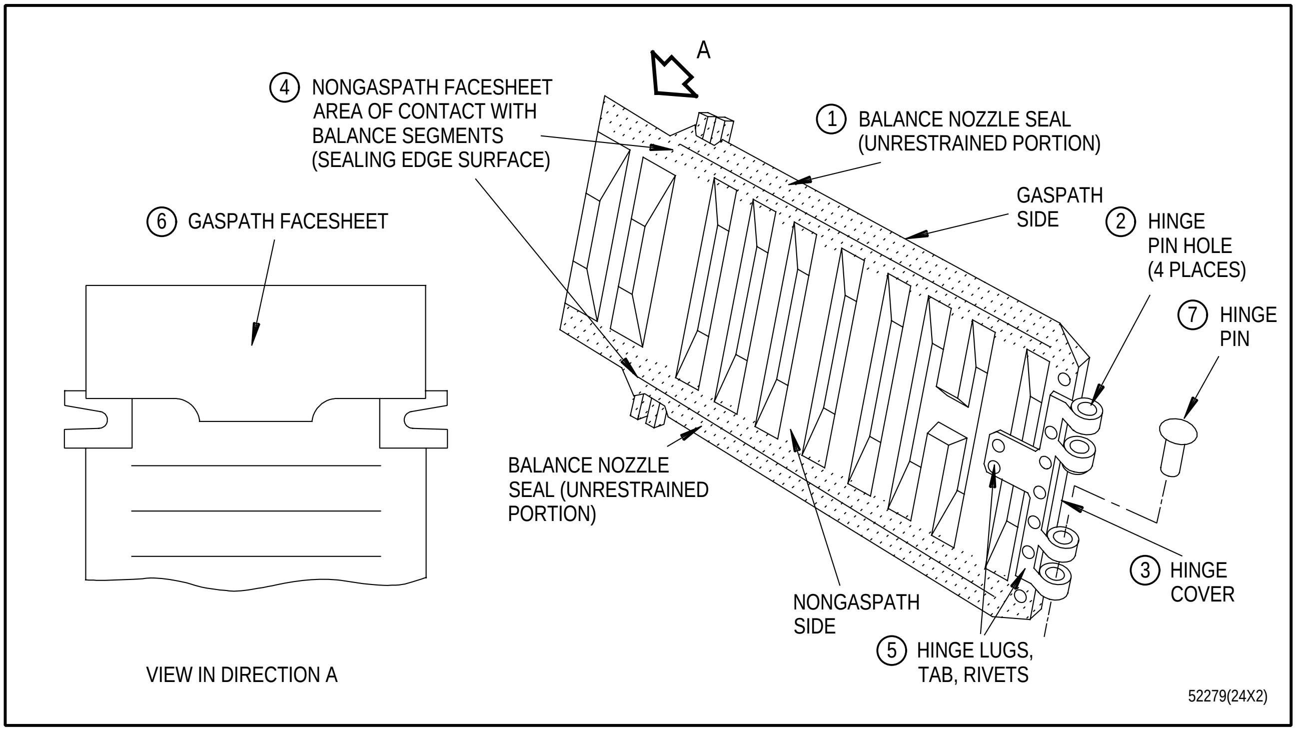
a. This work package contains instructions for inspection of augmentor balance nozzle segment seals.

2. AUGMENTOR BALANCE NOZZLE SEGMENT SEALS - INSPECTION.

(See Figure 1)

a. Visually and dimensionally inspect seals. See figure 1.

b. Cycle mark part per this work package prior to inspection. Seals with 2150 cycles must be replaced. After cycle marking, fluorescent penetrant inspect. Refer to T.O. 2J-F100-9.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Balance nozzle seal (unrestrained portion) -			
Warpage	Unlimited warpage of unrestrained portion of balance seal provided there are no kinks in sealing edge surface.	Not reparable	Replace balance nozzle segment seal assembly.

Figure 1. Augmentor Balance Nozzle Segment Seal - Inspection

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Hinge pin hole (4 places) -			
Wear	Hole diameter shall not exceed 0.110 inch. Minimum thickness of material around hole shall not be less than 0.025 inch.	Not reparable	Replace hinge per WP 409 00.
3. Hinge cover (gaspath side) -			
Cracks	Not serviceable	Not reparable	Replace hinge cover per WP 409 00.
4. Nongaspath facesheet -			
Wear in area of contact with augmentor balance nozzle segment (sealing edge surface)	Not serviceable	0.015 inch minimum material thickness	Plasma coat seals within limits per WP 409 00.
Cracks	Not serviceable	Not reparable	Replace balance nozzle segment seal assembly.
Wear in area of contact with actuator clevis	Not serviceable	Not reparable	Replace seal.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
5. Hinge lugs, hinge tab and rivets -			
Wear due to contact with mating surface	Not serviceable	Not reparable	Replace hinge and/or rivet per WP 409 00. Refer to T.O. 2-1-111.
6. Gaspatch facesheet -			
Side edge nicks, tears, or burrs due to contact with augmentor duct fingerseal	Not serviceable	Up to 0.030 inch minimum material thickness	Blend to eliminate jagged edges and protrusions
7. Hinge pin -			
Wear	0.089 inch minimum diameter	Not reparable	Replace pin

3. CYCLE MARKING.

(See Figure 2)

a. The augmentor balance nozzle segment seals must be cycle marked after removal to indicate part operating cycles. Mark the seals per the schedule shown in Table 1. Vibrapeen symbols. Refer to T.O. 2-1-111 in the areas shown in figure 2.

CAUTION

To avoid parts cracking, which will lead to nozzle burnthrough, parts should not be installed in lower cycle augmentor modules to avoid having parts operate beyond serviceable limits.

NOTE

Parts with 2150 cycles shall be replaced.

Table 1. Cycle Marking Codes

SYMBOL	CYCLES	SYMBOL	CYCLES
	0 NEW	[B]	1800 TO 2000
T	UNKNOWN	C	2000 TO 2200
A	0 TO 200	C̲	2200 TO 2400
A̲	200 TO 400	|C̲	2400 TO 2600
|A̲	400 TO 600	|C|	2600 TO 2800
|A|	600 TO 800	[C]	2800 TO 3000
[A]	800 TO 1000	D	3000 TO 3200
B	1000 TO 1200	D̲	3200 TO 3400
B̲	1200 TO 1400	|D̲	3400 TO 3600
|B̲	1400 TO 1600	|D|	3600 TO 3800
|B|	1600 TO 1800	[D]	3800 TO 4000

CONTINUE IN LIKE MANNER WITH E, F, G, ... AS REQUIRED

33647 (24X2)

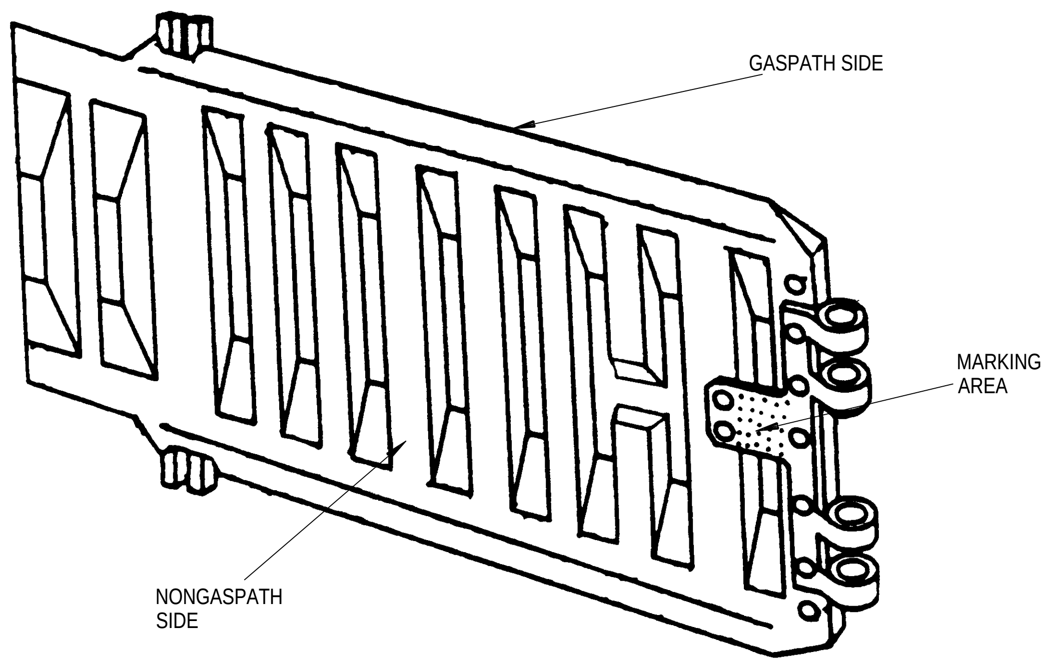
b. Example of symbols marked on parts:

B = 1200 TO 1400 CYCLES. THIS PART HAD BEEN A NEW SPARE.

|A| B = 1200 TO 1400 CYCLES. THIS PART HAD BEEN PREVIOUSLY MARKED AT THE 600 TO 800 CYCLE PERIOD.

T B |C = AT LEAST 2400 TO 2600 CYCLES. THIS PART HAD BEEN A USED, SERVICEABLE PART OF UNKNOWN CYCLES WHEN FIRST INSTALLED. IT HAD ALSO BEEN REMOVED AND MARKED AT THE 1200 TO 1400 CYCLE PERIOD.

52315 (12X2)



52281 (24X2)

Figure 2. Augmentor Balance Nozzle Segment Seal Assembly - Cycle Marking

WORK PACKAGE

TECHNICAL PROCEDURES

NOZZLE SEGMENT, CONVERGENT, AUGMENTOR -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	19	2 - 4	5	5 - 8	19

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for inspection of the augmentor convergent nozzle segment.

2. AUGMENTOR CONVERGENT NOZZLE SEGMENT - INSPECTION.

(See Figure 1.)

a. Inspect augmentor convergent nozzle segment per figure 1.

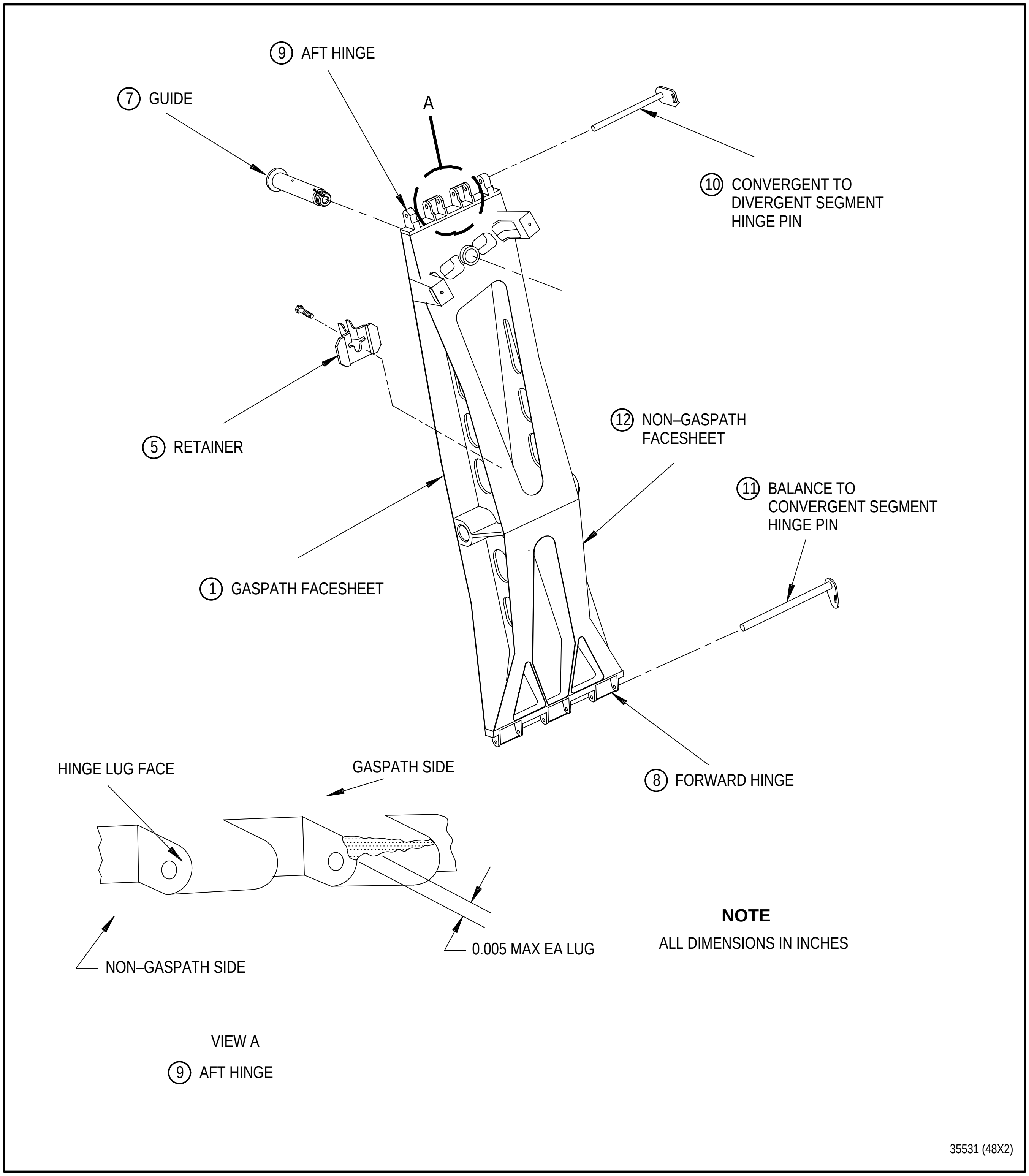


Figure 1. Augmentor Convergent Nozzle Segment - Inspection (Sheet 1 of 2)

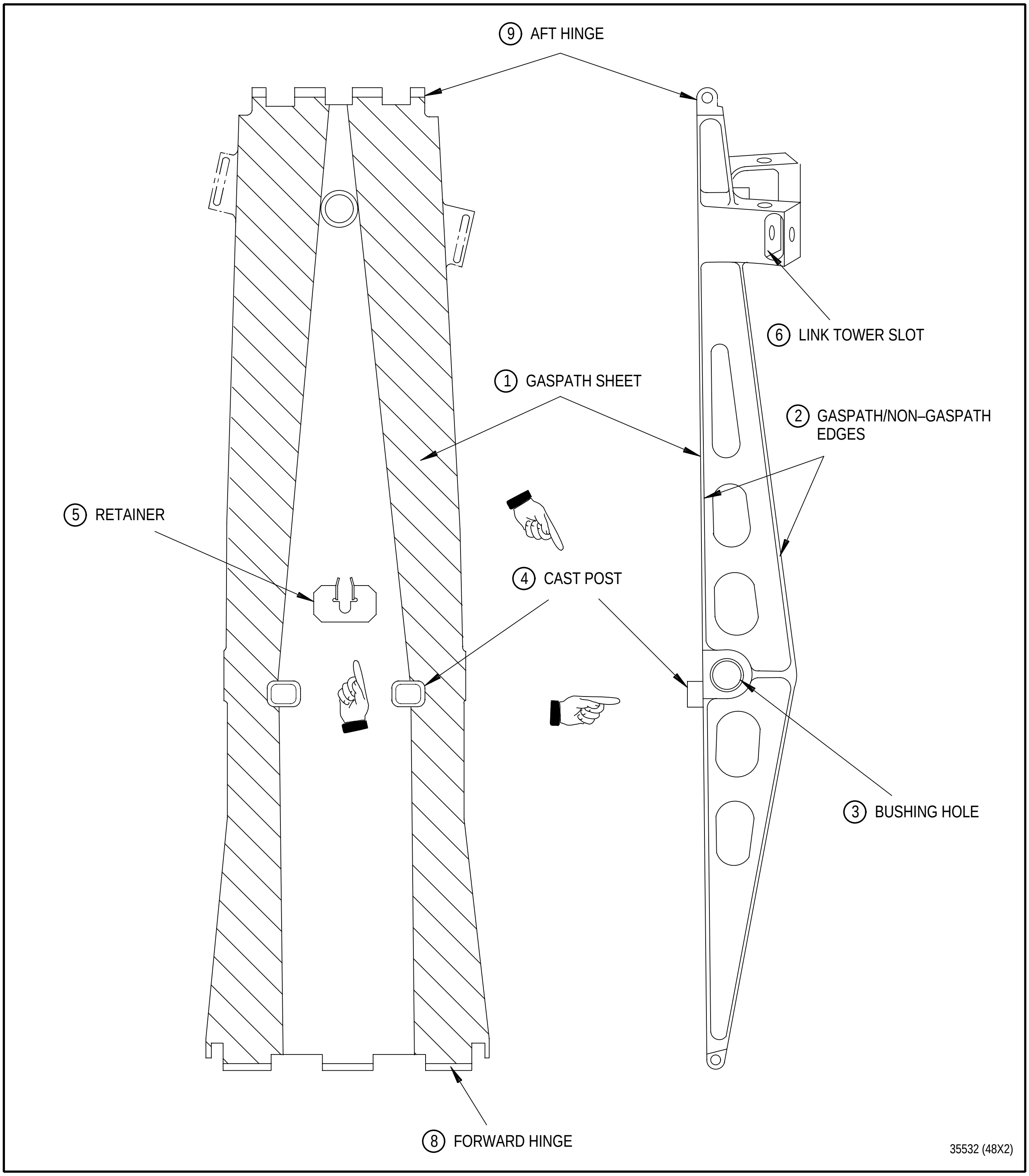


Figure 1. Augmentor Convergent Nozzle Segment - Inspection (Sheet 2 of 2)

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Gaspath facesheet -			
Warpage, concave depressions, dents	0.100 inch depth, cumulative total not to exceed 2.00 inches diameter. Punctures are not serviceable.	Not reparable	Replace convergent nozzle segment.
Cracks	Not serviceable	Not reparable	Replace convergent nozzle segment.
Wear into parent material, non-coated area	Any amount provided material thickness is 0.050 inch or greater	Not reparable	Replace convergent nozzle segment.
Wear into parent material, coated area	Not serviceable	Any amount provided material thickness is 0.050 inch or greater	Blend and replace plasma coating per WP 410 00.
Purple discoloration	Any amount provided module has not experienced a burn through	Not required	Not required.
Coating cracks/ chips	0.100 inch diameter up to 5 locations maximum	Any amount	Replace plasma coating per WP 410 00.
Coating wear	Any amount provided coating is not worn through to parent material	Any amount	Replace plasma coating per WP 410 00.
2. Gaspath and nongaspath facesheet edges -			
Cracks, nicks	Not serviceable	Blend shall not exceed 1/4 inch deep by one inch wide	Blend to remove defects. Replace convergent segment if reparable limits are exceeded.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Bushing hole -			
Elongation	0.725 inch diameter	Not reparable	Replace convergent nozzle segment.
4. Cast Post -			
Notch wear from contact with convergent seal reinforcing plate	0.020 inch deep	Not reparable	Replace convergent nozzle segment.
5. Retainer -			
Cracked, broken	Not serviceable	Not reparable	Replace retainer per WP 410 00.
Bent, dented	Serviceable provided mating part (convergent segment liner) can be properly installed. Straightening is not permitted.	Not reparable	Replace retainer per WP 410 00.
6. Link tower -			
Wear from short links	0.010 inch	Not reparable	Replace convergent nozzle segment.
7. Guide -			
Burrs and score marks	Not serviceable	Any amount provided marks are completely removed without affecting fit between guide and bearing	Polish using emery cloth. Replace guide if reparable limits are exceeded.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
8. Forward hinge -			
Hole elongation	0.200 inch diameter	Not reparable	Replace convergent nozzle segment.
Gaspath surface wear	0.010 inch	Not reparable	Replace convergent nozzle segment.
Lug face wear	0.010 inch	Not reparable	Replace convergent nozzle segment.
9. Aft hinge -			
Hole elongation	0.200 inch diameter	Not reparable	Replace convergent nozzle segment.
Gaspath surface wear	0.005 inch deep on any or all lugs	Not reparable	Replace convergent nozzle segment.
Lug face wear	0.010 inch	Not reparable	Replace convergent nozzle segment.
10. Convergent to Divergent Segment Hinge Pin -			
Wear	0.182 inch minimum diameter	Not reparable	Replace pin.
11. Balance to Convergent Segment Hinge Pin -			
Wear	0.182 inch minimum diameter	Not reparable	Replace pin.
12. Nongaspath Facesheet -			
Purple discoloration on cast surfaces	Any amount provided module has not experienced a burn-through	Not required	Not required.

WORK PACKAGE

TECHNICAL PROCEDURES

LEVER, AUGMENTOR NOZZLE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	9				
2	0				
3	9				
4	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

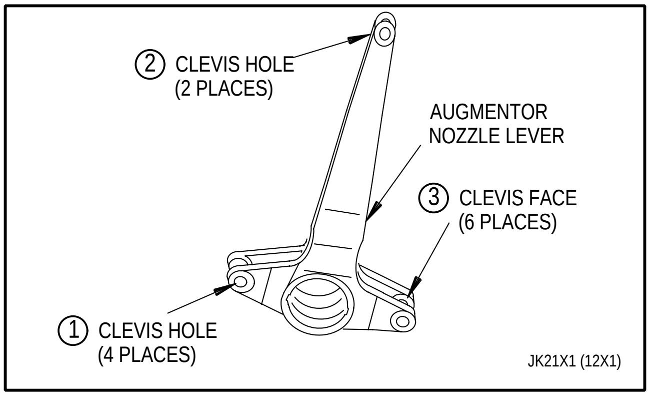
None

1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor nozzle lever.

2. AUGMENTOR NOZZLE LEVER - INSPECTION.
(See Figure 1.)

a. Inspect augmentor nozzle lever. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action

NOTE

The following inspection shall be performed on augmentor nozzle lever which has been removed from the augmentor convergent nozzle segment.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Clevis hole -			
Wear (ovalization)	0.254 inch maximum hole diameter	Not reparable	Replace augmentor nozzle lever.
2. Clevis hole -			
Wear (ovalization)	0.317 inch maximum hole diameter	Not reparable	Replace augmentor nozzle lever.
3. Clevis face -			
Wear	0.420 inch maximum gap between clevis faces (lugs)	Not reparable	Replace augmentor nozzle lever.

Figure 1. Augmentor Nozzle Lever - Inspection

3. FOLLOW-ON MAINTENANCE.

a. If removed, install augmentor nozzle lever on convergent nozzle segment. Refer to T.O. 2J-F100-53-10, WP 601 00.

WORK PACKAGE

TECHNICAL PROCEDURES

CONNECTING LINK, RIGID, AUGMENTOR NOZZLE -INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	9				
4 - 6	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Augmentor Duct and Nozzle Module - - - - - - - - - - - - - - - -	T.O. 2J-F100-53-10
Augmentor Duct and Nozzle Module - Cleaning - - - - - - - -	WP 201 00
Nondestructive Inspection -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

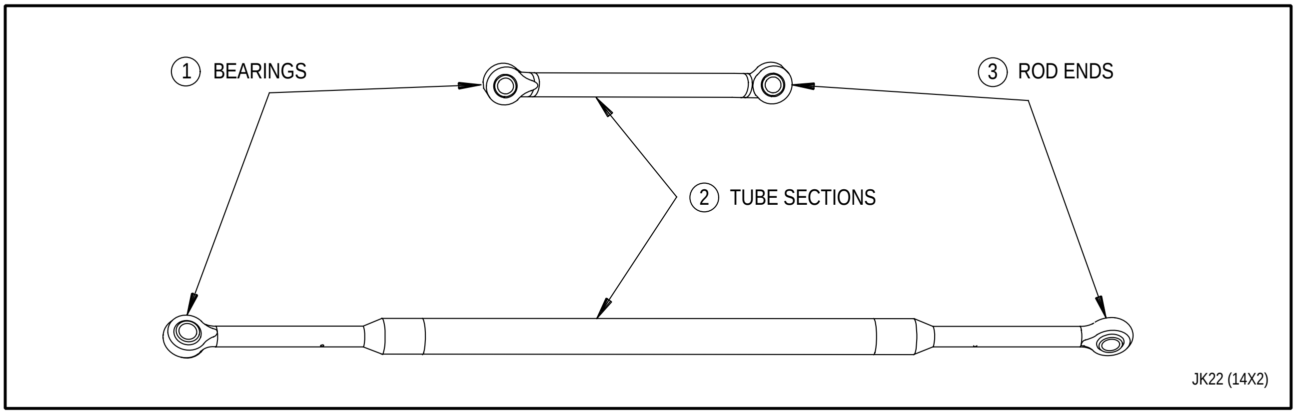
a. This work package contains instructions for inspection of augmentor nozzle rigid connecting links.

2. AUGMENTOR NOZZLE RIGID CONNECTING LINKS - INSPECTION.
(See Figures 1, 2, and 3.)

a. Inspect connecting links. See figure 1.

b. If bearings are dirty, clean links per WP 201 00 before reusing.

c. Fluorescent penetrant inspect. Refer to T.O. 2J-F100-9. No cracks allowed



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action

NOTE

- Radial play is defined as clearance between bearing ball andrace in a direction perpendicular to bore of ball.
- Axial play is defined as clearance between bearing ball andrace in same direction as bore of ball.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Bearing -			
Radial play	0.010 inch	Not reparable	Replace link.
Axial play	0.015 inch	Not reparable	Replace link.

Figure 1. Augmentor Nozzle Rigid Connecting Links - Inspection

Table 1. Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Bearing - (continued)			
Pitting	Not serviceable	Not reparable	Replace link.
Corrosion, abrasive foreign material between bearing ball and race	Not serviceable	Correction by cleaning only	Hand work and clean bearing per T.O. 2J-F100-53-10, WP 201 00. If bearing rotates freely after cleaning, it is serviceable. Replace link if condition cannot be corrected.
2. Tube section -			
Bent, buckled, flat spots, cracked	Not serviceable	Not reparable	Replace link.
Weld cracks	Not serviceable	Not reparable	Replace link.
3. Rod ends -			
Bent, cracked	Not serviceable	Not reparable	Replace link.
Wear, rod end faces or spherical OD	0.005 inch	0.010 inch	Hand blend wear area to remove any raised metal

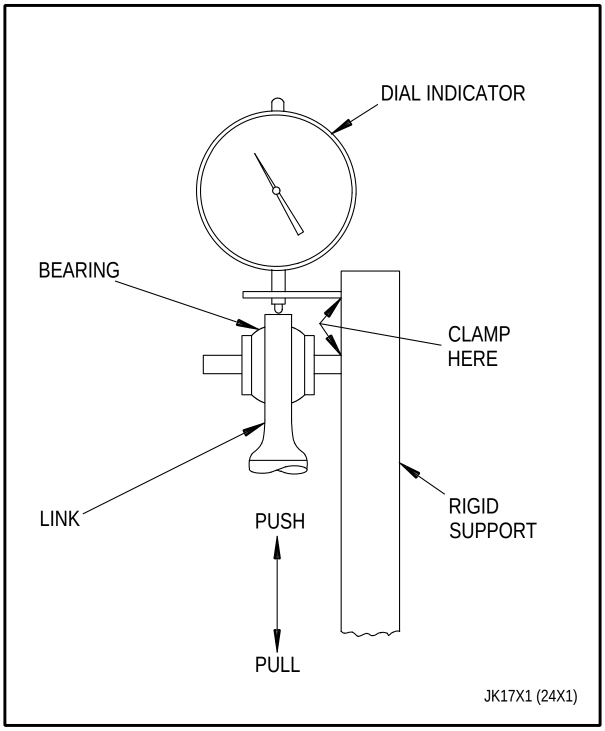


Figure 2. Recommended Inspection Technique for Determining Radial Play of Augmentor Nozzle Rigid Connecting Link Bearings

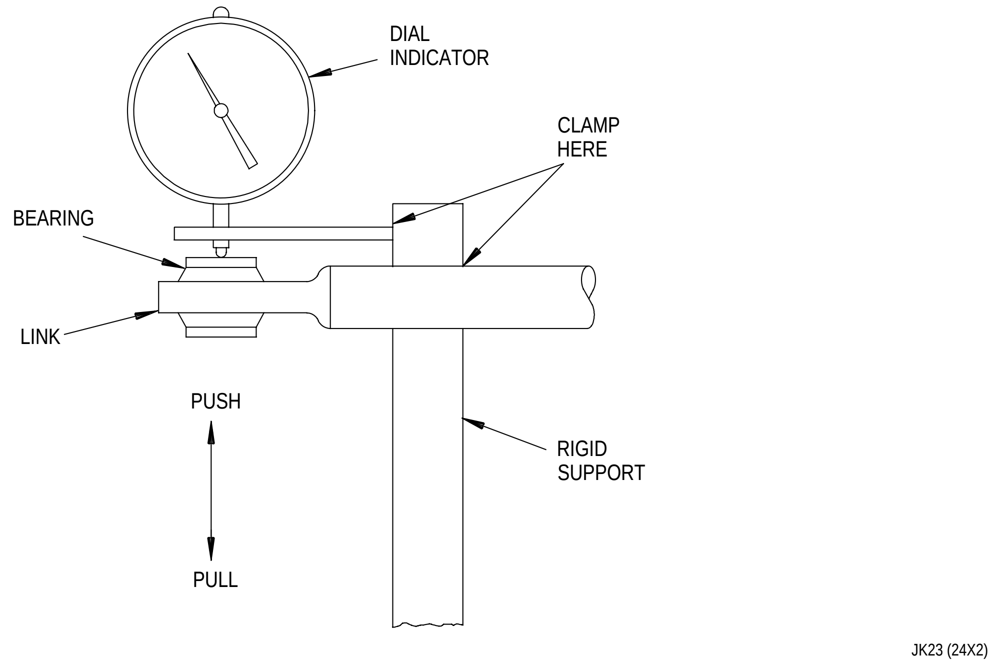


Figure 3. Recommended Inspection Technique for Determining Axial Play of Augmentor Nozzle Connecting Link Bearings

WORK PACKAGE

TECHNICAL PROCEDURES

LINER, AUGMENTOR CONVERGENT NOZZLE SEGMENT -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

THIS WORK PACKAGE SUPERSEDES WP 313 00 THROUGH AND INCLUDING CHANGE 7.

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 10	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Introduction and General Information	T.O. 2J-F100-53-1
Qualified Repair Source List (QRSL)	WP 606 00
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Liner, Augmentor Convergent Nozzle Segment - Repair	WP 413 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor convergent nozzle segment liner.

2. AUGMENTOR CONVERGENT NOZZLE SEGMENT LINER - INSPECTION.

(See Figure 1.)

a. Inspect liner. See figure 1.

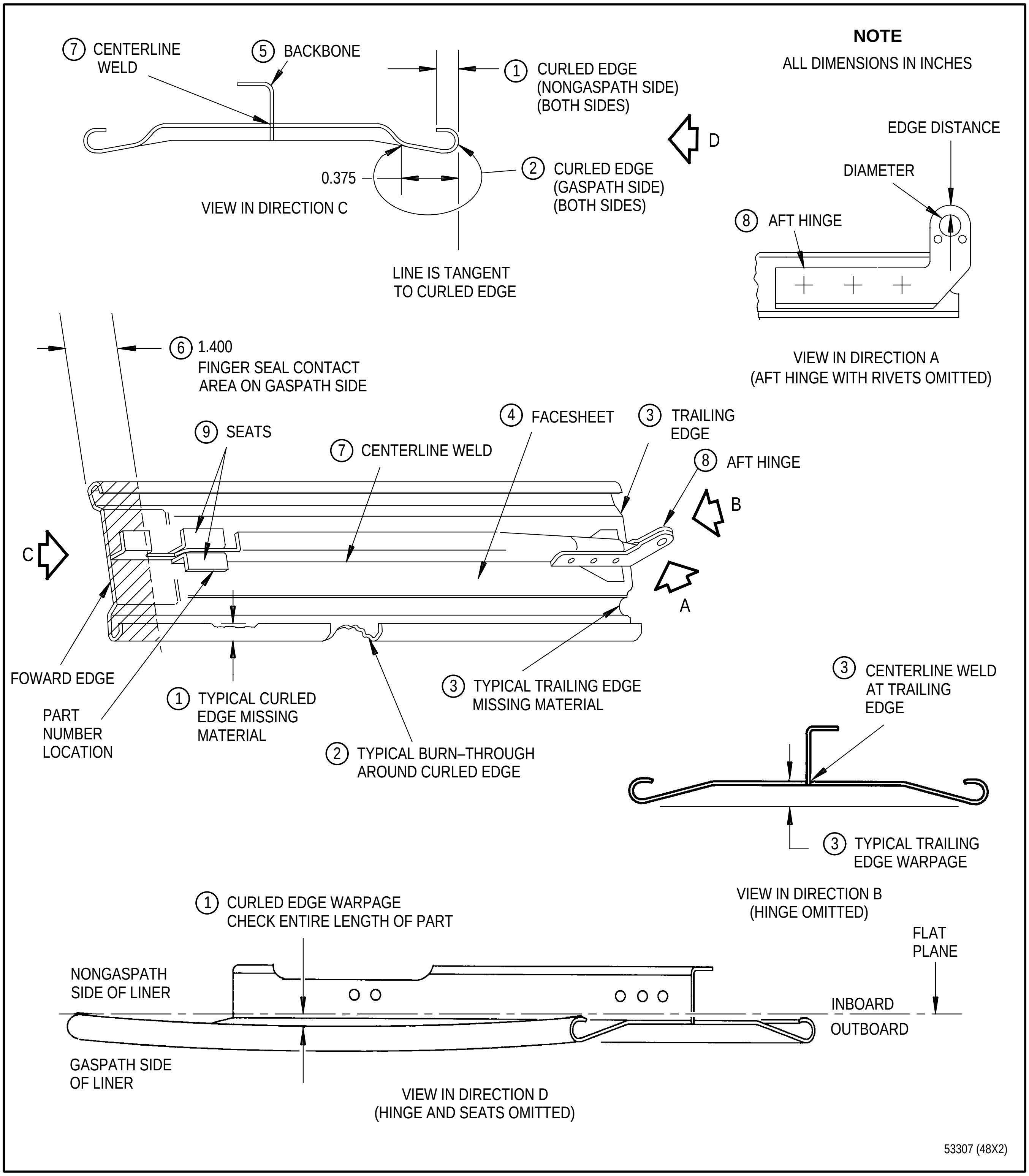


Figure 1. Augmentor Convergent Nozzle Segment Liner - Inspection

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action

CAUTION

To prevent damage to silicide coating on liner segment, handle and inspect liner with care.

NOTE

Material erosion is detectable by a white or gray layer of oxidized material across the edge of the eroded area.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Curled edges (nongaspath side) -			
Warpage JGDFGAN	0.200 inch deviation from a flat surface in free state (inboard or outboard.)	Any amount	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Wear JGDFGAH	Permissible provided there is no evidence of material erosion.	Any amount	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Missing material JGDFGAH	Up to 0.100 inch deep measured from adjacent intact curled edge provided length does not exceed 0.250 inch per area and there is no evidence of material erosion. Maximum of two areas along each side of assembly.	Any amount	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Missing or chipped coating JGDFGAC	Not serviceable.	Any amount	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Curled edges (gaspath side excluding finger seal contact area) -			
Burn-through around edge or missing material JGDFGAL	Not serviceable	Maximum of two areas along each side of assembly provided length and width of each area does not exceed 0.375 inch.	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Missing or chipped coating JGDFGAC	Not serviceable	Any amount	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
3. Trailing edge -			
Warpage JGDFGAN	Maximum height of 0.360 inch	Any amount	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Erosion of the centerline weld JGDFGAD	Not serviceable	a. Depth less than or equal to 0.100 inch.	a. Repair per WP 413 00 (recoat). Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
		b. Depth greater than 0.100 inch.	b. Replace liner
Missing material JGDFGAC	Up to 0.100 inch deep along trailing edge provided maximum length of each area does not exceed 0.250 inch and there is no evidence of material erosion.	Any amount provided depth does not exceed 0.500 inch.	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

Legend for figure 1 (continued)

Inspection Area - Conditionz	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Trailing edge - (continued)			
Missing or chipped coating JGDFGAC	Not serviceable	Any amount	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
4. Facesheet area forward of trailing edge to 1.400 inches from leading edge - (gaspath and nongaspath sides) -			
Cracks JGDFGAM	Not serviceable	Any amount provided length does not exceed 0.375 inch and crack is a minimum of 0.150 inch from backbone.	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Missing material JGDFGAM	Not serviceable	Up to two areas provide length and width of each area do not exceed 0.375 inch and missing material is a minimum of 0.150 inch from backbone.	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.
Missing or chipped coating JGDFGAC	Not serviceable	Any amount	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Facesheet area forward of trailing edge to 1.400 inches from leading edge - (gaspath and nongaspath sides) - (continued)			
Dents, Wrinkles	Up to 0.030 inch depth and 0.030 inch height provided maximum total area per location does not exceed 1.000 square inches.	Not reparable.	Replace liner.
5. Backbone -			
Cracks, erosion, missing material, and/ or bent	Not serviceable.	Not reparable.	Replace liner.
Dents, wrinkles	Up to 0.030 inch depth and 0.005 inch height provided maximum total area per location does not exceed 0.100 square inches.	Not reparable.	Replace liner.
6. Finger seal contact area -			
Wear through parent material JGDFGAK	Not serviceable	Any amount of wear up to 1.400 inches from forward edge.	Repair per WP 413 00. Forward reparable parts to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
6. Finger seal contact area - (continued)			
Chipped, cracked and/or missing hardcoat JGDFGAG	Up to two locations provided within an area 1.400 inch from forward edge and 1.150 inch from backbone (on each side) and area of each location does not exceed 0.020 square inches, which is equivalent to a 0.140 by 0.140 inch area. Not serviceable in all other areas.	Any amount	Repair finger seal per WP 413 00.
Dents, wrinkles	Up to 0.030 inch depth and 0.005 inch height provided maximum total area per location does not exceed 0.100 square inches.	Not reparable.	Replace liner.
7. Centerline weld -			
Erosion, cracks	Not serviceable	Not reparable.	Replace liner.
8. Aft hinge -			
Hole wear	Hole diameter up to 0.220 inch provided there is a minimum edge distance of 0.070 inch.	Not reparable.	Replace hinge per WP 413 00.
Side wear	Up to 0.005 inch deep provided there is a minimum hinge material overall thickness of 0.095 inch.	Not reparable.	Replace hinge per WP 413 00.
Bent, loose	Not serviceable.	Not reparable.	Replace hinge per WP 413 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
9. Seats -			
Loose, torn, and/or distorted	Not serviceable.	Not reparable.	Replace seats per WP 413 00.
Wear	Any amount provided material overall thickness is not less than 0.020 inches.	Not reparable.	Replace seats per WP 413 00.
Dents, wrinkles	Up to 0.030 inch depth and 0.005 inch height provided maximum total area per location does not exceed 0.100 square inches.	Not reparable.	Replace seats per WP 413 00.

WORK PACKAGE

TECHNICAL PROCEDURES

NOZZLE SEGMENT, DIVERGENT, AUGMENTOR -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	20	3	9	4 - 8	20
2	2				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection	T.O. 2J-F100-9
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Nozzle Segment, Divergent, Augmentor - Repair	WP 414 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor divergent nozzle segment.

2. AUGMENTOR DIVERGENT NOZZLE SEGMENT - INSPECTION.

(See Figure 1.)

a. Inspect divergent nozzle segment. See figure 1.

b. Fluorescent penetrant inspect nozzle segments. Refer to T.O. 2J-F100-9. See figure 1.

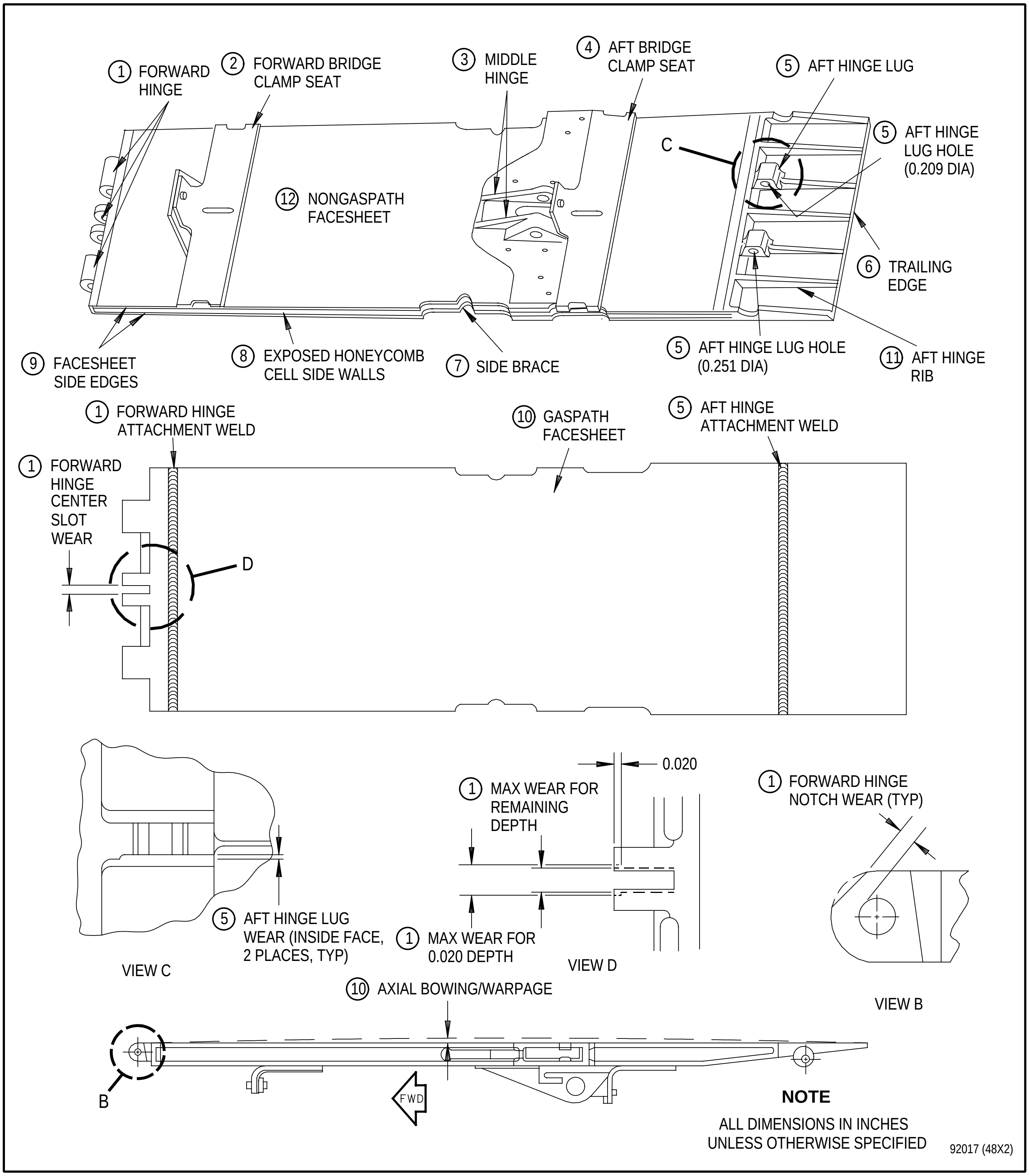


Figure 1. Augmentor Divergent Nozzle Segment - Inspection

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Forward hinge -			
Hole elongation	0.206 inch diameter	Any amount	Replace forward hinge per WP 414 00.
Center slot wear	0.165 inch wide except 0.170 inch wide for 0.020 inch inside lug contour	Any amount	Puddle weld repair per WP 414 00.
Attachment weld cracking	Not serviceable	a) 0.750 inch	a) Weld repair per WP 414 00.
		b) Any amount	b) Replace hinge per WP 414 00.
Notch wear from mating hinge seal	0.090 inch minimum lug thickness	a) Minimum wall thickness equal to or greater than 0.090 inch	a) Blend repair
		b) Minimum wall thickness less than 0.090 inch	b) Puddle weld repair per WP 414 00.
2.,4. Forward and aft bridge clamp seat -			
Worn through missing hardcoat	Not serviceable	Not reparable	Replace seat per WP 414 00.
Wear into parent metal	Not serviceable	Not reparable	Replace seat per WP 414 00.
Depression/ dents	0.050 inch maximum depth 1.000 square inch maximum area.	Not reparable	Replace seat per WP 414 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Middle hinge -			
Hole elongation	0.338 inch diameter and minimum wall thickness of 0.100 inch.	Not reparable	Replace divergent nozzle segment assembly.
Side wear	Wear on either face not to exceed 0.030 inch.	Not reparable	Replace divergent nozzle segment assembly.
5. Aft hinge -			
Hole elongation	0.214 inch diameter for 0.209 inch hole. 0.256 inch diameter for 0.251 inch hole.	Any amount	Weld repair or replace aft hinge per WP 414 00.
Thinning of lug due to wear from external segment hinge lugs	Step wear not to exceed 0.040 inch on each lug face.	Any amount	Puddle weld repair per WP 414 00.
Attachment weld cracking	Not serviceable	a) 0.750 inch	a) Weld repair per WP 414 00.
		b) Any amount	b) Replace hinge per WP 414 00.
6. Trailing edge -			
Missing material, bends, nicks, and cracks	Not serviceable	0.500 inch deep from trailing edge	Straighten any bends, blend nicks and breaks, and stop drill cracks per WP 414 00.
7. Side brace -			
Bent on side edge	Not serviceable	Any amount	Coldwork to original flat position within ±0.020 inch.
Separation forward of clearance cut	Not serviceable	Not reparable	Replace divergent nozzle segment assembly.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
8. Exposed honeycomb cell side walls -			
Crushed, torn or dented cell wall(s)	• Unlimited damage areas not to exceed 1.0 inches long, and 0.250 inch deep in any one area on each side. • Core material located within 0.125 inch of outer edges may have dents, deformities, tears, and rips. • Crushed, torn, or dented cell walls adjacent to formed areas of facesheets are created during manufacture and are serviceable. • Crushed, torn, or dented walls of incomplete cells along facesheet edges are created during manufacture and are serviceable.	Not reparable	Replace divergent nozzle segment assembly.
9. Facesheet side edges -			
Nicks, cuts, tears	Not serviceable	0.125 inch deep after blending	Blend damaged area maintaining a minimum radius of 0.150 inch.
Wear due to contact with divergent seal brace rivet	Not serviceable	0.125 inch maximum depth after blending	Blend damaged area per WP 414 00.

Table 1. Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
10. Gaspath facesheet -			
Cracks	Not serviceable	Not reparable	Replace divergent nozzle segment assembly.
Missing or worn through thermal barrier coating	Not serviceable	See corrective action.	Replace coating per WP 414 00.
Delamination	Not serviceable	Not reparable	Replace divergent nozzle segment assembly.
Parent material wear	Up to 0.010 inch deep, measured from intact thermal barrier coating, 0.012 inch minimum material thickness	See corrective action.	Replace coating only on segments within serviceable limits per WP 414 00.
NOTE Weld bead height on gaspath facesheet can influence bowing/warpage measurements taken on a flat surface. Exclude these welds from measurements of bowing/warpage.			
Axial bowing/ warpage	0.200 inch along axial centerline in either direction	Not reparable	Replace divergent nozzle segment assembly.
NOTE Where stop drilling is required, use of carbide or cobalt drill is recommended.			
11. Aft hinge rib -			
Cracks	Not serviceable	Up to 0.500 inch	Repair by stop drilling per WP 414 00.
Axial or circumferential bowing/warpage	0.100 inch measured perpendicular to centerline from aft hinge gaspath surface.	Up to 0.300 inch measured perpendicular to centerline from aft hinge gaspath surface	Repair per WP 414 00.
12. Nongaspath facesheet -			
Dents and Depressions	Up to 0.070 inch deep, 0.375 inch across, without cracks.	Not reparable	Replace divergent nozzle segment.

WORK PACKAGE

TECHNICAL PROCEDURES

NOZZLE SEGMENT, BALANCE, AUGMENTOR -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	26	3	16	4 - 6	26
2	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection.	T.O. 2J-F100-9
Augmentor Duct and Nozzle Module.	T.O. 2J-F100-53-10
Nozzle Segment, Balance, Augmentor - Scheduled Inspection	WP 415 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor balance nozzle segment.

2. AUGMENTOR BALANCE NOZZLE SEGMENT ASSEMBLY - INSPECTION.
(See Figure 1.)

a. Inspect balance nozzle segment per figure l.

b. Fluorescent penetrant inspect machined U-channel and aft hinge per SPOP 62. Refer to T.O. 2-1-111. No cracks allowed.

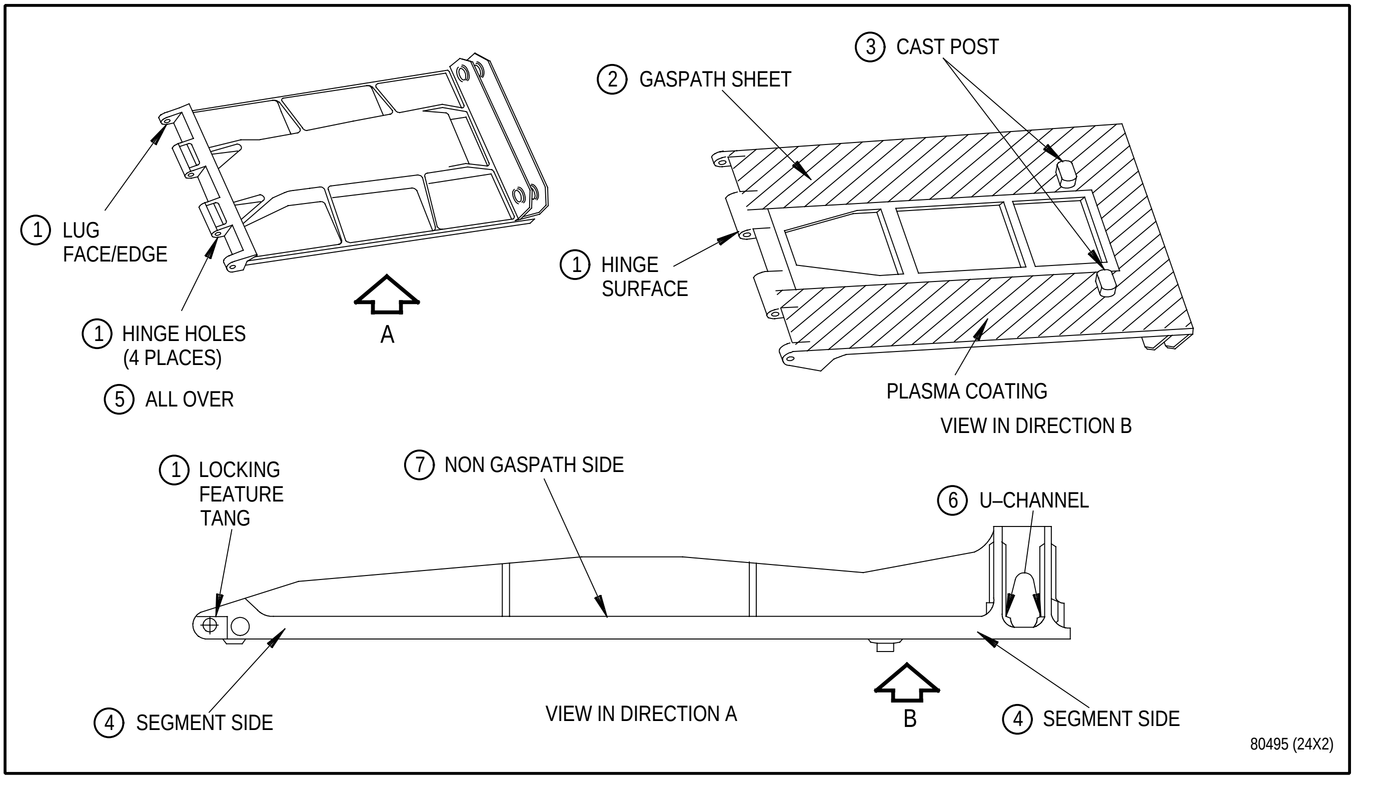


Figure 1. Augmentor Balance Nozzle Segment Assembly - Inspection (Sheet 1 of 2)

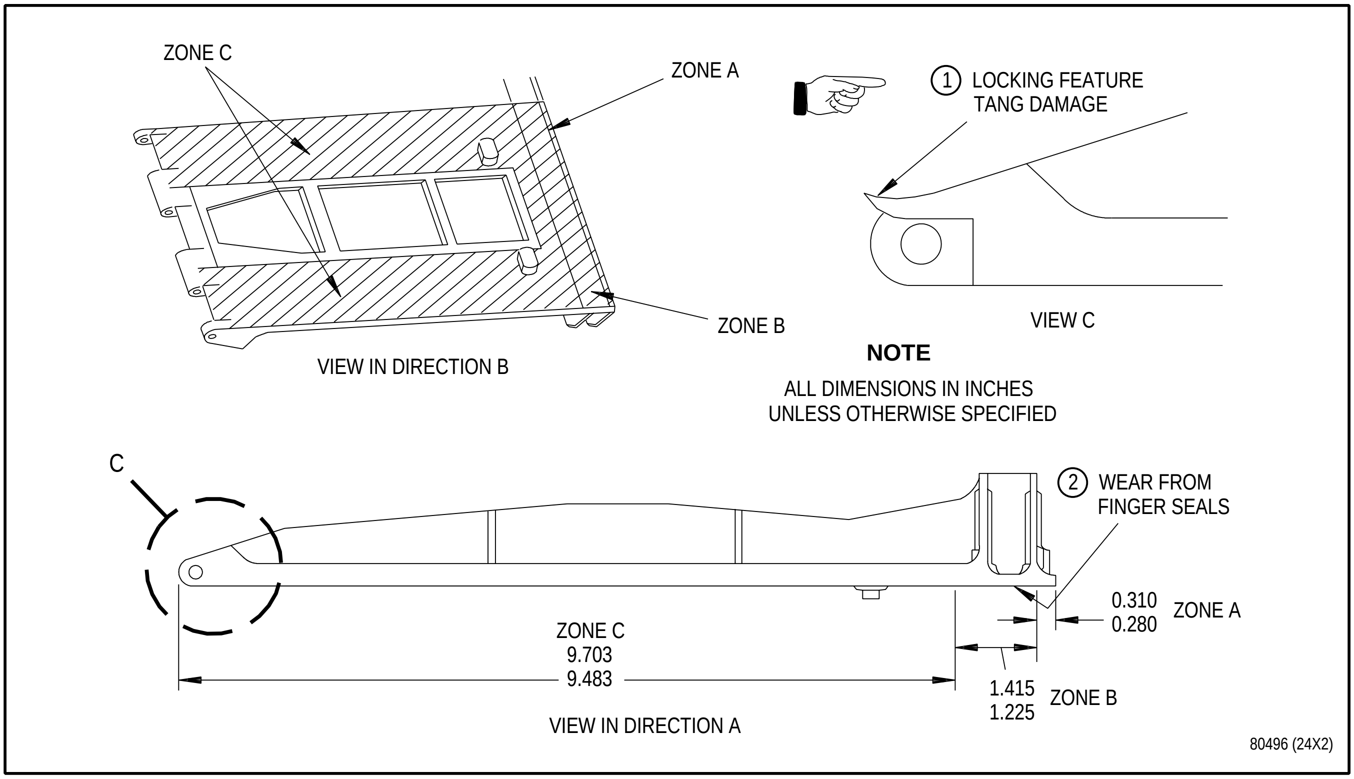


Figure 1. Augmentor Balance Nozzle Segment Assembly - Inspection (Sheet 2 of 2)

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Hinge -			
Surface wear	Not serviceable	a. Up to 0.025 inch deep	a. Blend repair per WP 415 00.
		b. Greater than 0.025 inch deep	b. Weld repair per WP 415 00.
Locking feature tang damage	Not serviceable	Any amount	Weld repair per WP 415 00.
Lug face/edge wear	0.005 inch deep	a. Up to 0.020 inch deep	a. Blend repair per WP 415 00.
		b. Greater than 0.020 inch deep	b. Weld repair per WP 415 00.
Hole wear/ elongation	0.205 inch hole diameter	Any amount	Weld repair per WP 415 00.
2. Gaspath sheet -			
Missing plasma coating worn through to parent material	10% of coated surface area may be missing coating	Any amount	Replace plasma coating per WP 415 00.
Wear into parent material			
ZONE A (contact with finger seals)	Not Serviceable	Any amount provided material thickness is not less than 0.025 inch	Blend and replace plasma coating per WP 415 00.
ZONE B (contact with finger seals)	Not Serviceable	Any amount provided material thickness is not less than 0.050 inch	Blend and replace plasma coating per WP 415 00.
ZONE C (contact with balance seals)	Not Serviceable	Any amount provided material thickness is not less than 0.050 inch	Replace plasma coating per WP 415 00.
Purple discoloration	Any amount provided module has not experienced a burn-through	Not required	Not required

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Cast post -			
Notch wear from sliding contact with balance seal reinforcing plate	0.020 inch deep	Any amount	Weld repair per WP 415 00.
4. Segment side			
Edge cracks	Not serviceable	a. Up to 0.010 inch deep	a. Blend repair per WP 415 00.
		b. 0.010 inch to 0.030 inch deep	b. Weld repair per WP 415 00.
		c. Greater than 0.030 inch deep	b. Replace balance nozzle segment.
5. All over -			
Cracks	Not serviceable	Not reparable	Replace balance nozzle segment.
Round bottom nicks, dents, depressions	0.010 inch deep provided cumulative total of damaged zone widths does not exceed 1.00 inch diameter. Punctures are not serviceable.	Not reparable	Replace balance nozzle segment.
6. U-Channel -			
Link wear	0.010 inch deep	a. Up to 0.020 inch deep	a. Blend repair per WP 415 00.
		b. Greater than 0.020 inch deep	b. Replace balance nozzle segment.
7. Nongaspath side -			
Purple discoloration	Any amount provided module has not experienced a burn-through	Not required	Not required

WORK PACKAGE

TECHNICAL PROCEDURES

BEARING, SPHERICAL PLAIN, BALANCE, NOZZLE SEGMENT RIGIDCONNECTING LINK -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	9				
2 - 3	0				
4	9				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

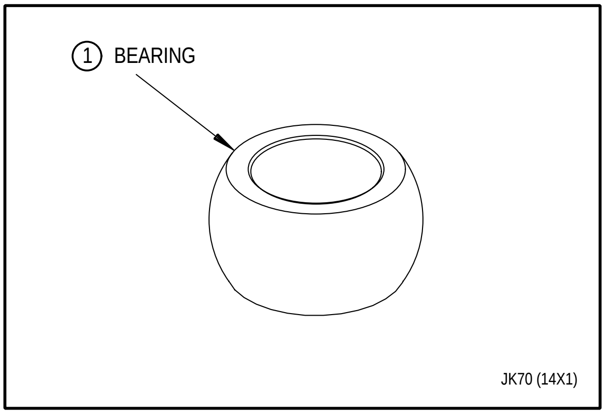
1. INTRODUCTION.

a. This work package contains instructions for the inspection of the balance nozzle segment rigid connecting link spherical plain bearing.

2. BALANCE NOZZLE SEGMENT RIGID CONNECTING LINK SPHERICAL PLAIN BEARING - INSPECTION.

(See Figure 1.)

a. Visually inspect spherical plain bearing. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Bearing -			
Rust, corrosion	Not serviceable	Any amount	Clean bearing. Refer to T.O. 2J-F100-53-10, WP 201 00. Replace bearing if cleaning does not remove condition.
Galling	Not serviceable	Not reparable	Replace bearing.
Pitting	Not serviceable	Not reparable	Replace bearing.
Nicks	Raised metal not serviceable.	0.010 inch in depth after blending	Blend raised metal.
Cracks	Not serviceable	Not reparable	Replace bearing.
Wear (on chamfer)	0.010 inch deep	Not reparable	Replace bearing.

Figure 1. Balance Nozzle Segment Rigid Connecting Link Spherical Plain Bearing - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

RING, SYNCHRONIZING, AUGMENTOR NOZZLE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 12

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 6	8				
7 - 12 Added	8				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Nondestructive Inspection	T.O. 2J-F100-9
Introduction and General Information	T.O. 2J-F100-53-1
General Repair Procedures - Buffing, Power Denicking of Titanium Parts (SPOP 532)	SWP 091 01
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Augmentor Nozzle Assembly - Disassembly	WP 021 00
Augmentor Nozzle Assembly - Cleaning	WP 202 00
Augmentor Nozzle Assembly - Assembly	WP 603 00
Ring, Synchronizing, Augmentor Nozzle - Repair	WP 417 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor nozzle synchronizing ring.

NOTE

Early configuration augmentor nozzle synchronizing ring assemblies are distinguishable by sharply chamfered corners and should be discarded. (Reference PN 4074229, Figure 1.)

2. AUGMENTOR NOZZLE SYNCHRONIZING RING ASSEMBLY (PN 4074229) - INSPECTION.

(See Figure 1.)

a. Visually inspect ring assembly per figure 1.

b. Clean ring per WP 202 00.

c. Fluorescent penetrant inspect for cracks. Refer to T.O. 2J-F100-9 and evaluate results per SFPS-M and SFPS-38 in T.O. 2-1-111. No cracks allowed.

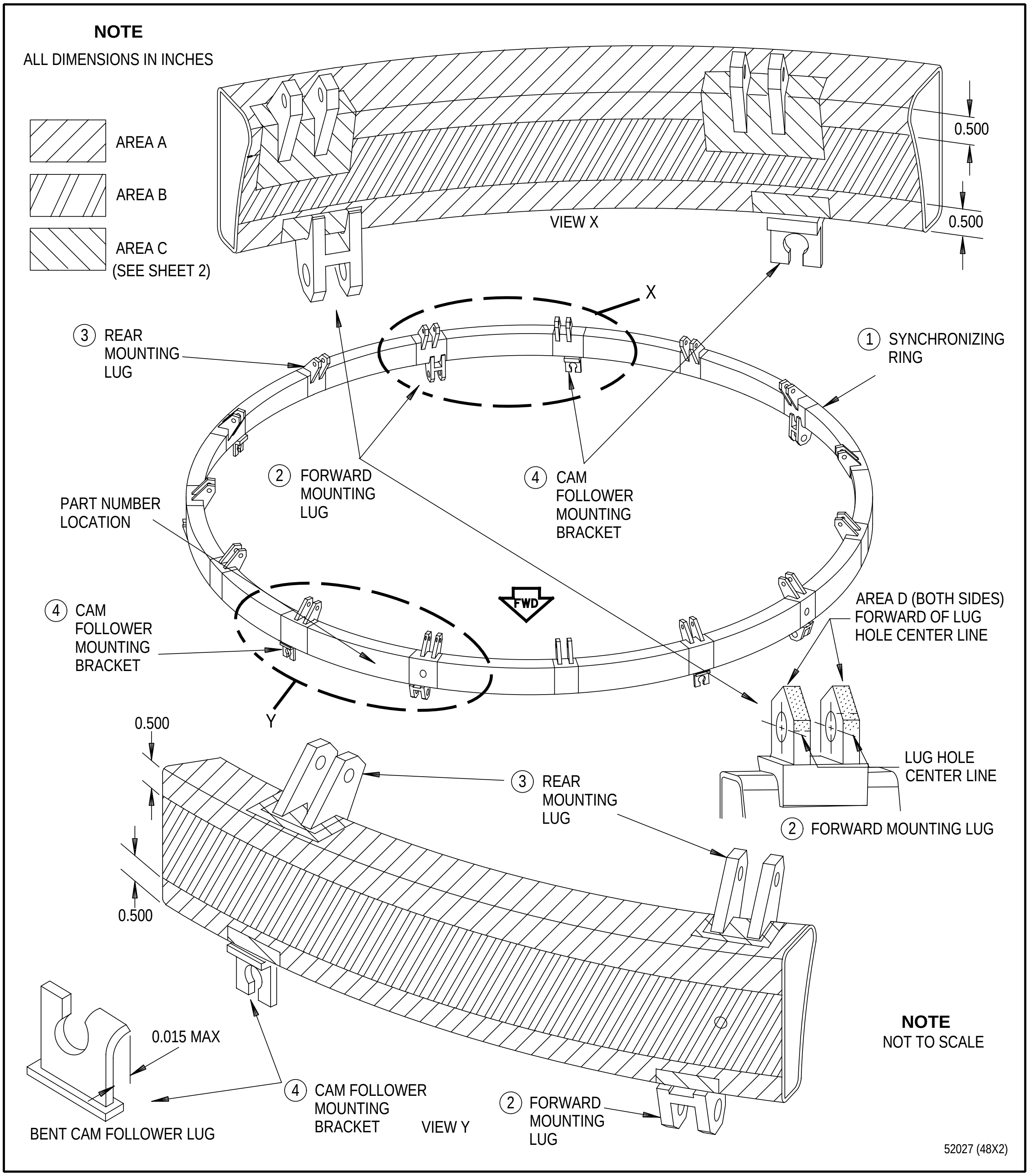


Figure 1. Augmentor Nozzle Synchronizing Ring Assembly (PN 4074229) - Inspection (Sheet 1 of 3)

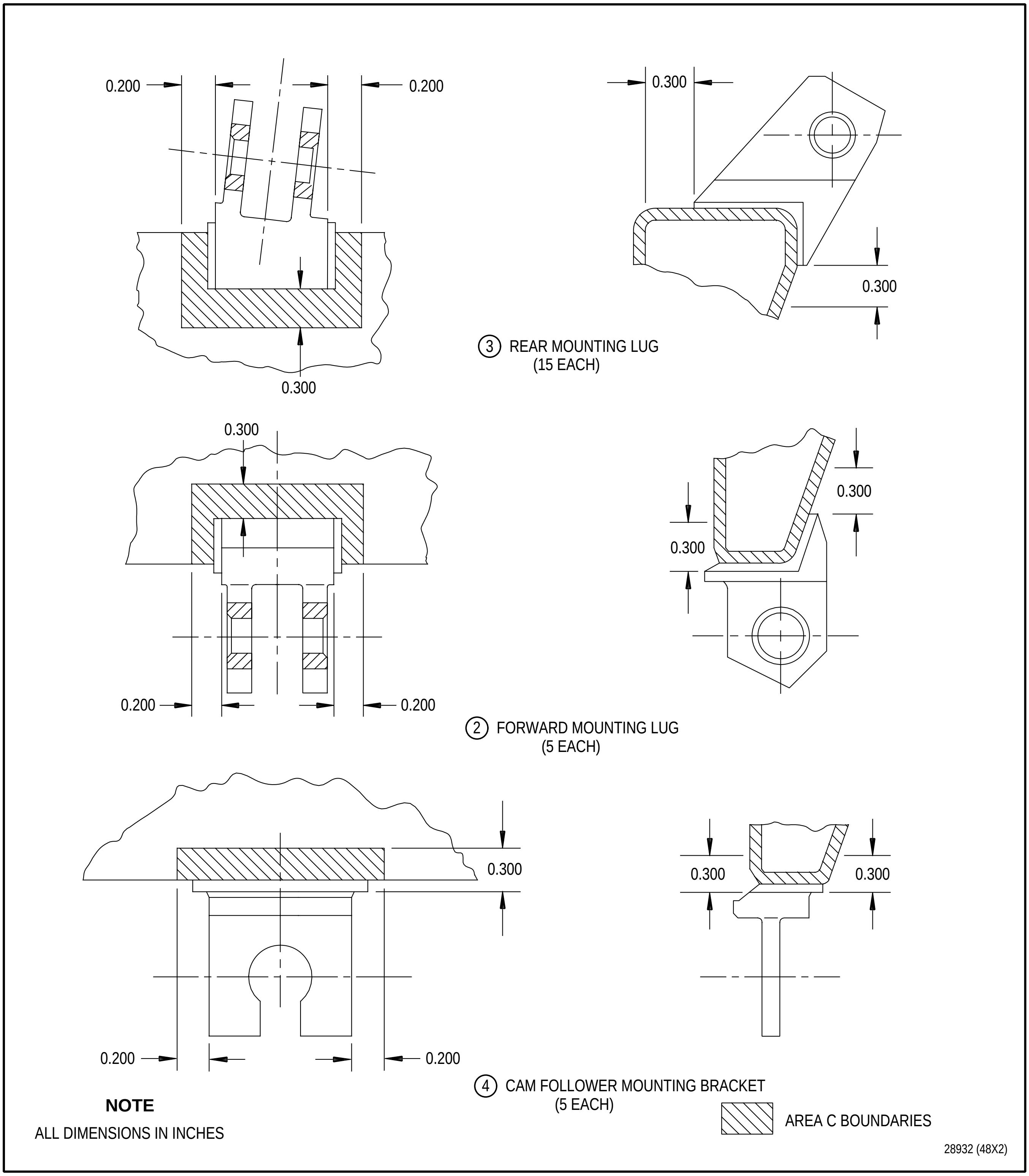


Figure 1. Augmentor Nozzle Synchronizing Ring Assembly (PN 4074229) - Inspection (Sheet 2 of 3)

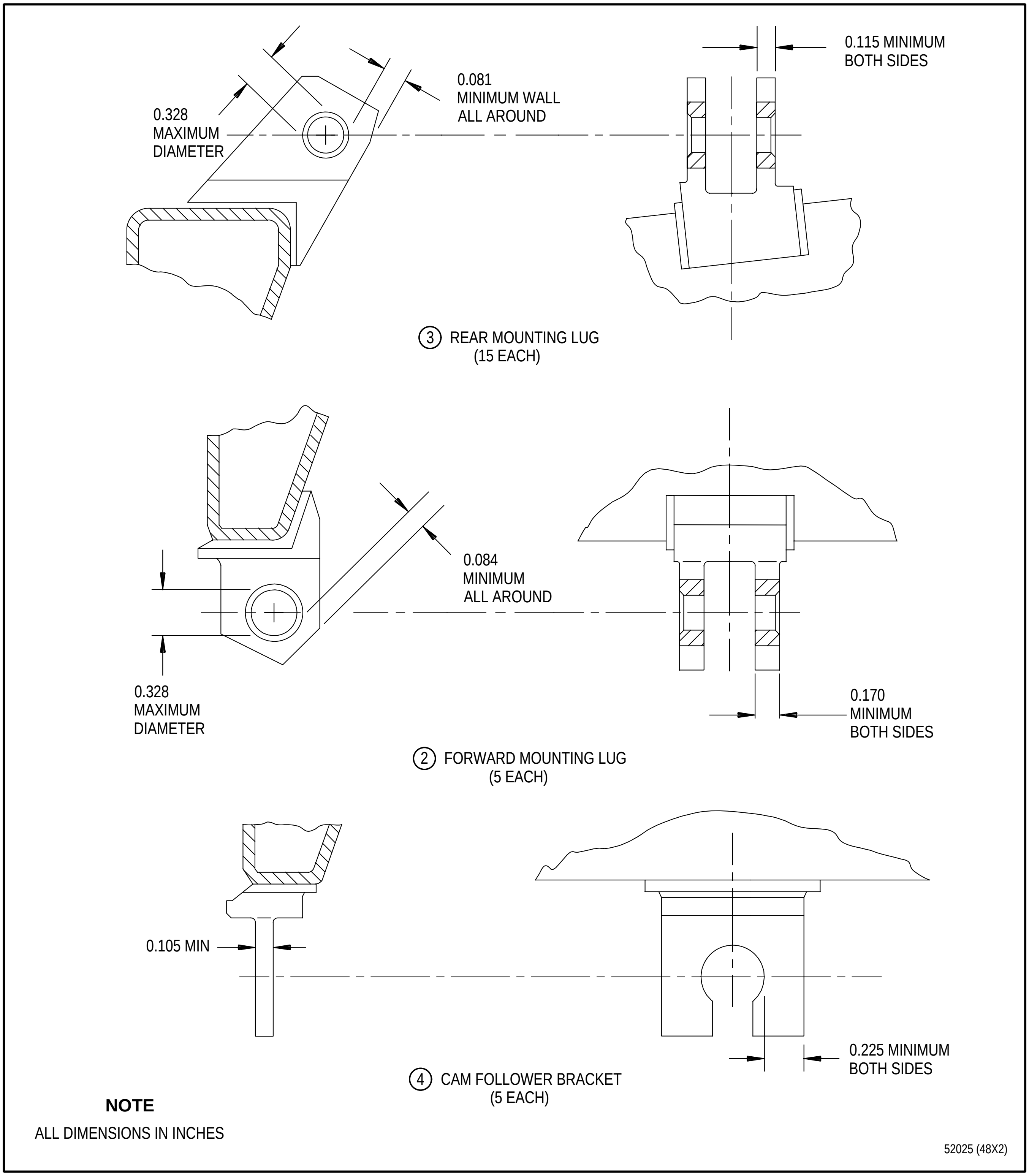


Figure 1. Augmentor Nozzle Synchronizing Ring Assembly (PN 4074229) - Inspection (Sheet 3 of 3)

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Ring -			
Cracks, fractured	Not serviceable	Not reparable	Replace ring.
Distorted, bent	With ends of any 3 cam follower brackets contacting a flat surface, other 2 brackets shall be 0.100 inch off the flat surface	Not reparable	Replace ring.

NOTE

Light metal splatter is defined as an area of individual splatters of foreign material which covers less than 25 percent of any part of any one square inch area. Any splatter beyond this limit is considered heavy metal splatter.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Light metal splatter	Not serviceable	Any amount	Remove with steel wool or fine file. Blend per WP 417 00.
Heavy metal splatter, erosion, burnt	Not serviceable	Not reparable	Replace ring.
Area A dents	Any number 0.010 inch deep	Not reparable	Replace ring.
Area B dents	Any number 0.020 inch deep	Not reparable	Replace ring.
Area C dents	Not serviceable	Not reparable	Replace ring.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Ring - (continued)			

NOTE

- Blending not permitted on welds.
- Rubmarks are defined as areas of adjacent scratches.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Rubmarks, scratches, raised metal	Serviceable provided a stylus having a 0.007 to 0.010 inch nose radius does not hesitate (catch) when passed over it. See paragraph 3 for general stylus usage instructions.	In area A, 0.048 inch minimum wall after blending. (0.010 inch deep reference) In area B, 0.038 inch minimum wall after blending.(0.020 inch deep reference) In area C, 0.055 inch minimum wall after blending. (0.003 inch deep reference)	Blend per WP 417 00. Replace overlimit ring.
2. Forward mounting lug -			
Hole wear or elongation	0.328 inch diameter or 0.084 inch minimum wall	Not reparable	Replace ring
Chipped coating	Any amount	Not required	Not required
Rubmarks, scratches, raised metal	Not serviceable	Maximum depth after polishing limited to 0.040 inch and minimum wall thickness of 0.170 inch shall be maintained and 0.084 inch around hole (edge distance).	Blend per WP 417 00. Replace overlimit ring.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Forward mounting lug - (continued)			

NOTE

Special attention shall be given to lug weld and adjacent area for detection of cracks.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Broken, bent, cracked	Not serviceable	Not reparable	Replace ring.
3. Rear mounting lug -			
Hole wear or elongation	0.328 inch diameter or 0.081 inch minimum wall	Not reparable	Replace ring.
Chipped coating	Any amount	Not required	Not required
Rubmarks, scratches, raised metal	Not serviceable	Maximum depth after polishing limited to 0.040 inch and minimum wall thickness of 0.115 inch shall be maintained and 0.081 inch around hole (edge distance).	Blend per WP 417 00. Weld repair overlimit lug.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Rear mounting lug - (continued)			

NOTE

Special attention shall be given to lug weld and adjacent area for detection of cracks.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Broken, bent, cracked	Not serviceable	Not reparable	Replace ring.
Side face wear (inner and outer)	Acceptable provided: total depth for each lug ear is 0.037 inch or less and hole edge distance in wear area of bolthole exceeds 0.100 inch	Not reparable	Replace ring.

NOTE

A bent cam follower bracket lug is indicative of ring overstress and is tightly controlled due to part fatigue life and dimensional integrity concerns.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Cam follower bracket -			
Bent lug ears	Each ear must be flat within 0.015 inch as shown in figure 2.	Not reparable	Replace ring.
Hole wear or elongation	Dimension across hole 0.450 inch over 25% of circumference and 0.444 inch over remaining 75% and 0.240 inch minimum around hole.	Not reparable	Replace ring.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Cam follower bracket - (continued)			
Broken or cracked	Not serviceable	Not reparable	Replace ring.
Chipped coating	Any amount	Not required	Not required
Wear	0.105 inch minimum thickness	Not reparable	Replace ring.
Rubmarks, scratches, raised metal	Not serviceable	Maximum depth after blending limited to 0.040 inch around outer edges and minimum edge distance of 0.225 inch must be maintained. Minimum thickness after blending shall be 0.105 inch.	Blend per WP 417 00. Replace overlimit ring.

3. GENERAL STYLUS USAGE.

(See Figure 2.)

a. Judge surface scratches, rubmarks and raised metal using a 0.007 to 0.010 inch nose radius stylus as follows:

(1) Hold the stylus lightly near the top, between the thumb and forefinger, inclined at a 60 degree angle toward the imperfection.

(2) Push the stylus forward over the surface without applying pressure other than the weight of the stylus itself, in a direction approximately 90 degrees to the general lay of the imperfection.

(3) If the point does not hesitate (catch) in the surface imperfection being judged, the imperfection is acceptable.

(4) If the 60 degree angle position is impractical due to part configuration, hold the stylus 90 degrees to the work surface and use 3X to 4X magnification to aid in evaluation of imperfections which cause the stylus to hesitate.

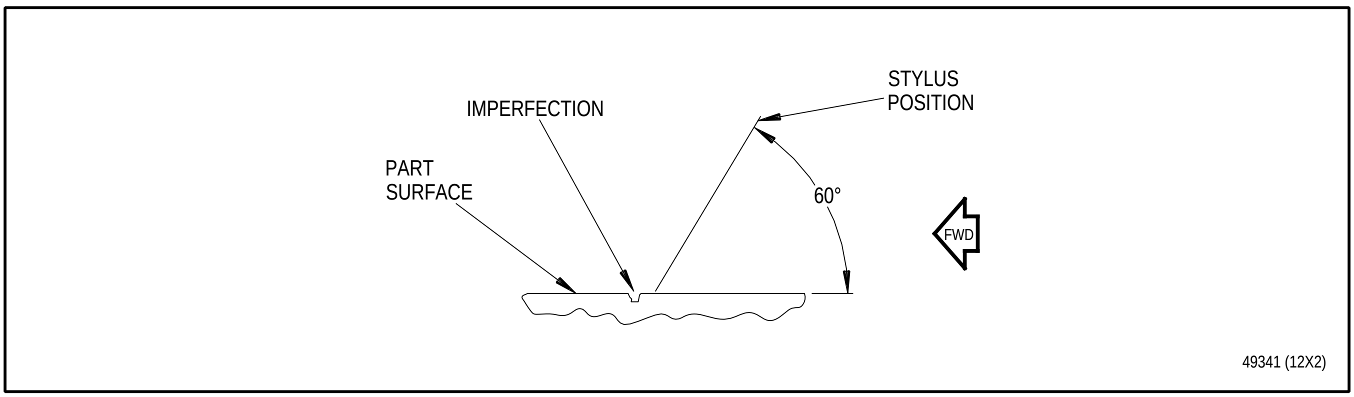


Figure 2. General Stylus Usage.

WORK PACKAGE

TECHNICAL PROCEDURES

BRACKET, AUGMENTOR DIVERGENT CONNECTING LINK -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	9				
3	0				
4	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

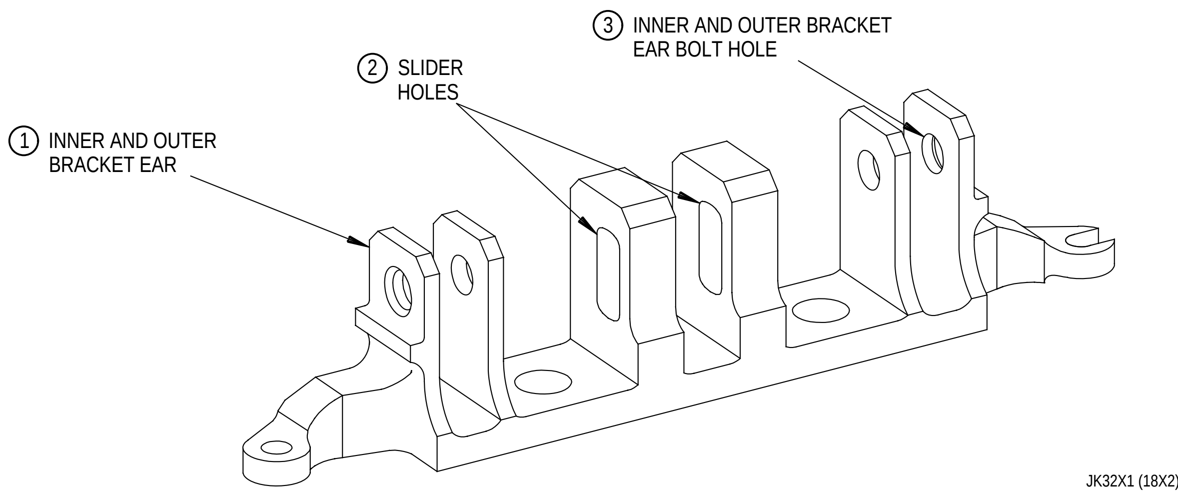
1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor divergent connecting link bracket.

2. AUGMENTOR DIVERGENT CONNECTING LINK BRACKET - INSPECTION.
(See Figure 1.)

a. Visually inspect bracket. See figure 1.

b. Fluorescent penetrant inspect. Refer to T.O. 2J-F100-9. No cracks allowed.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Inner and outer bracket ear -			
Face wear	Wear is serviceable to 0.070 inchear thickness.	Not reparable	Replace bracket.
2. Slider holes -			
Wear	Wear/elongation is serviceable to a minimum edge distance of 0.070 inch.	Not reparable	Replace bracket.
3. Inner and outer bracket bolt hole -			
Elongation	Elongation is serviceable to a minimum edge distance of 0.150 inch.	Not reparable	Replace bracket.

Figure 1. Augmentor Divergent Connecting Link Bracket - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

RETAINER, AUGMENTOR NOZZLE PIN -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	0				
4 Blank	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

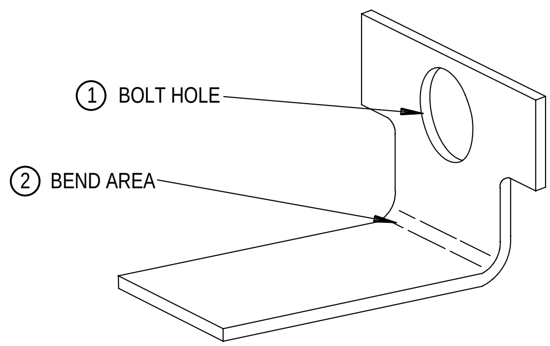
1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor nozzle pin retainer.

2. AUGMENTOR NOZZLE PIN RETAINER - INSPECTION.

(See Figure 1.)

a. Inspect augmentor nozzle pin retainer. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Bolt hole -			
Cracks	Not serviceable	Not reparable	Replace retainer.
2. Bend area -			
Cracks	Not serviceable	Not reparable	Replace retainer.

Figure 1. Augmentor Nozzle Pin Retainer - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

CONNECTING LINK, RIGID, AUGMENTOR DIVERGENT NOZZLE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	9				
4 Blank	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection	T.O. 2J-F100-9
Augmentor Duct and Nozzle Module	T.O 2J-F100-53-10
Connecting Link, Rigid, Augmentor Divergent Nozzle - Repair	WP 420 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

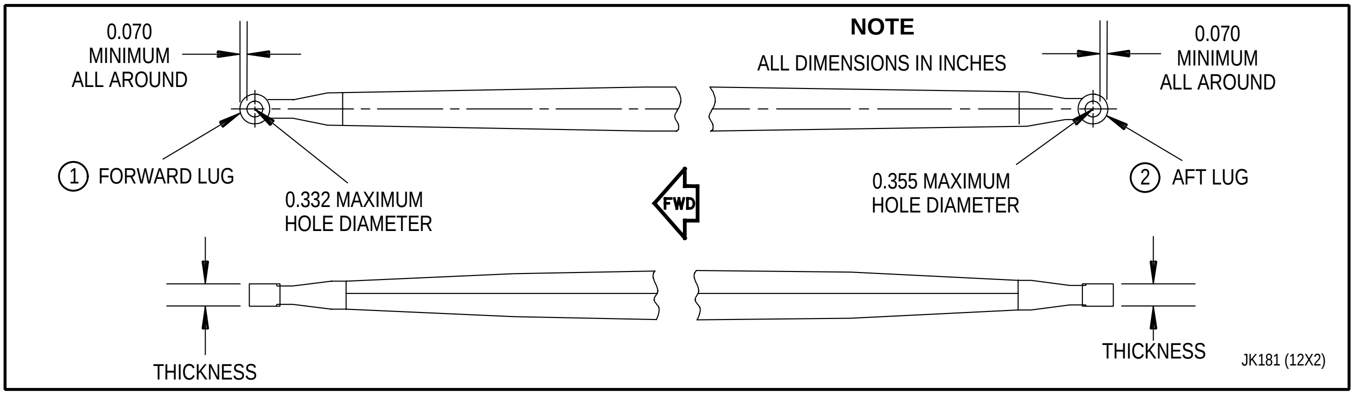
1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor divergent nozzle rigid connecting link.

2. AUGMENTOR DIVERGENT NOZZLE RIGID CONNECTING LINK - INSPECTION. (See Figure 1.)

a. Inspect connecting link. See figure 1.

b. Fluorescent penetrant inspect. Refer to T.O. 2J-F100-9. No cracks allowed.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Forward lug -			
Hole wear	0.332 inch maximum hole diameter is serviceable provided a 0.070 inch minimum edge distance exists.	0.034 inch minimum edge distance	Weld repair per WP 420 00.
Thickness wear	Minimum 0.360 inch	Minimum 0.260 inch	Weld repair per WP 420 00.
2. Aft lug -			
Hole wear	0.355 inch maximum hole diameter is serviceable provided a 0.070 inch minimum edge distance exists.	0.030 inch minimum edge distance	Weld repair per WP 420 00.
Thickness wear	Minimum 0.430 inch	Minimum 0.330 inch	Weld repair per WP 420 00.

Figure 1. Augmentor Divergent Nozzle Rigid Connecting Link - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

CONNECTING LINK, AUGMENTOR NOZZLE SYNCHRONIZING RING -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4	9				
5 Added	9				
6 Blank Added	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection	T.O. 2J-F100-9
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Cleaning	WP 201 00
Connecting Link, Augmentor Nozzle Synchronizing Ring - Repair	WP 421 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

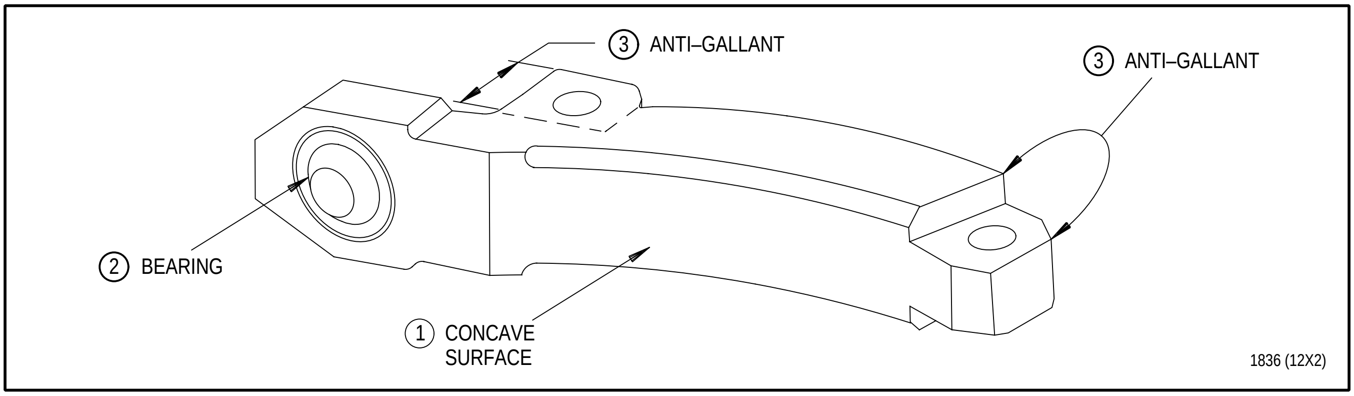
1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor nozzle synchronizing ring connecting link.

2. AUGMENTOR NOZZLE SYNCHRONIZING RING CONNECTING LINK - INSPECTION.
(See Figures 1 and 2.)

a. Inspect augmentor nozzle synchronizing ring connecting link. See figures 1 and 2.

b. Fluorescent penetrant inspect. Refer to T.O. 2J-F100-9. No cracks allowed



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Concave surface -			
Scoring, gouging (from possible interference with balance/ convergent seal hinge)	Not serviceable	Any amount	Blend raised metal or sharp edges per WP 421 00.
2. Bearing -			
Excessive rough running, binding or frozen	Not serviceable	Any amount	Work free per WP 201 00 or replace bearing per WP 421 00.
Radial play (See figure 2.)	0.010 inch	Not reparable	Replace bearing per WP 421 00.
Cracks	Not serviceable	Not reparable	Replace bearing per WP 421 00.
3. Anti-gallant -			
Missing	Not serviceable	Any amount	Repair per WP 421 00.

Figure 1. Augmentor Nozzle Synchronizing Ring Connecting Link - Inspection

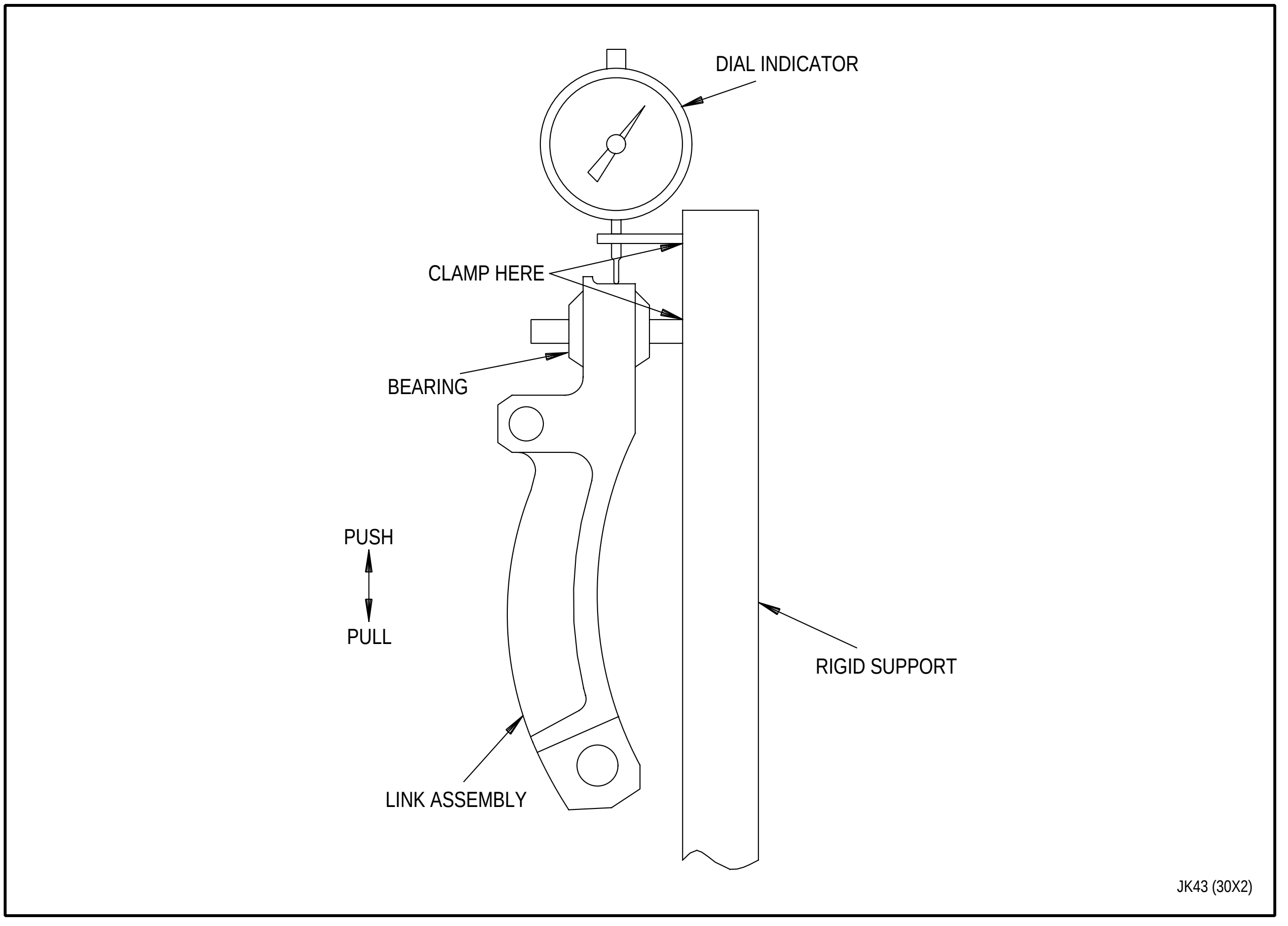


Figure 2. Recommended Inspection Technique for Determining Radial Play of Augmentor Nozzle Synchronizing Ring Connecting Link Bearing

WORK PACKAGE

TECHNICAL PROCEDURES

SUPPORT (RIGHT AND LEFT), AUGMENTOR NOZZLE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	0				
2 - 3	9				
4 Blank	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Augmentor Duct and Nozzle Module - - - - - - - - - - - - - - - - - -	T.O. 2J-F100-53-10
Support and Bearing Assembly, Augmentor Nozzle - Repair	WP 422 00
Nondestructive Inspection -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

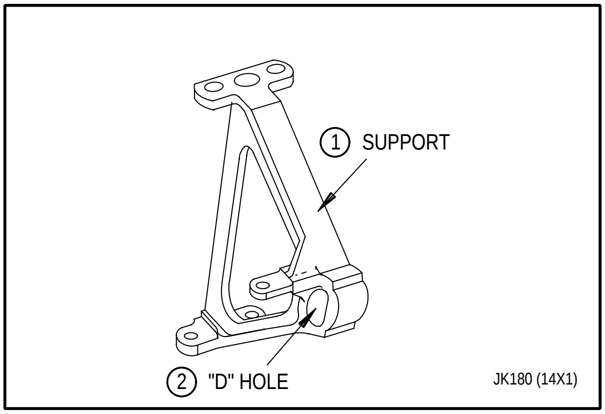
a. This work package contains instructions for inspection of augmentor nozzle supports.

2. AUGMENTOR NOZZLE SUPPORTS - INSPECTION.

(See Figure 1.)

a. Inspect augmentor nozzle supports. See figure 1.

b. Fluorescent penetrant inspection. Refer to T.O. 2J-F100-9. No cracks allowed.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Support -			
Cracks	Not serviceable	Not reparable	Replace support.
2. "D" Hole -			
Light galling	Not serviceable	Any amount provided that ID does not exceed 0.628 inch after burrs are removed.	Blend repair per WP 422 00.
Wear exposing voids or subsurface defects	Not serviceable	Not reparable	Replace support.

Figure 1. Augmentor Nozzle Support - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

CAM FOLLOWER, ROLLER BEARING, AUGMENTOR NOZZLE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 5	0				
6 Blank	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

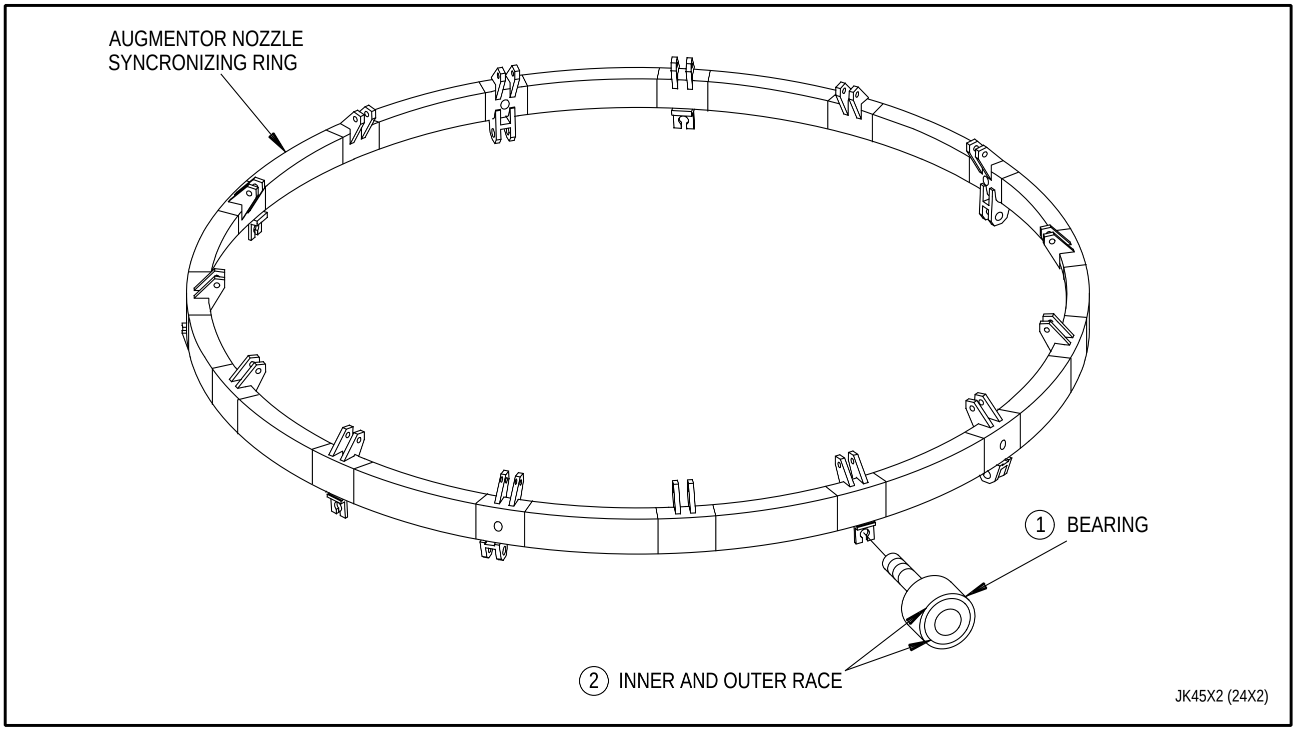
a. This work package contains instructions for inspection of augmentor nozzle roller bearing cam follower.

2. AUGMENTOR NOZZLE ROLLER BEARING CAM FOLLOWER - INSPECTION.

(See Figures 1 and 2.)

a. Visually inspect cam follower. See figure 1.

b. Check cam follower radial and axial play. See figure 2.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Bearing -			
Cracks	Not serviceable	Not reparable	Replace cam follower.
Roughness	Any amount - not cause for rejection	Not applicable	Not applicable
Rotation hang-up or sticking	Not serviceable if condition remains after cleaning	Not reparable	Replace cam follower.
2. Inner and outer races -			
Wear (radial play) (See figure 2.)	Up to 0.015 inch	Not reparable	Replace cam follower.
Wear (axial play) (See figure 2.)	Up to 0.015 inch	Not reparable	Replace cam follower.

Figure 1. Augmentor Nozzle Roller Bearing Cam Follower - Inspection

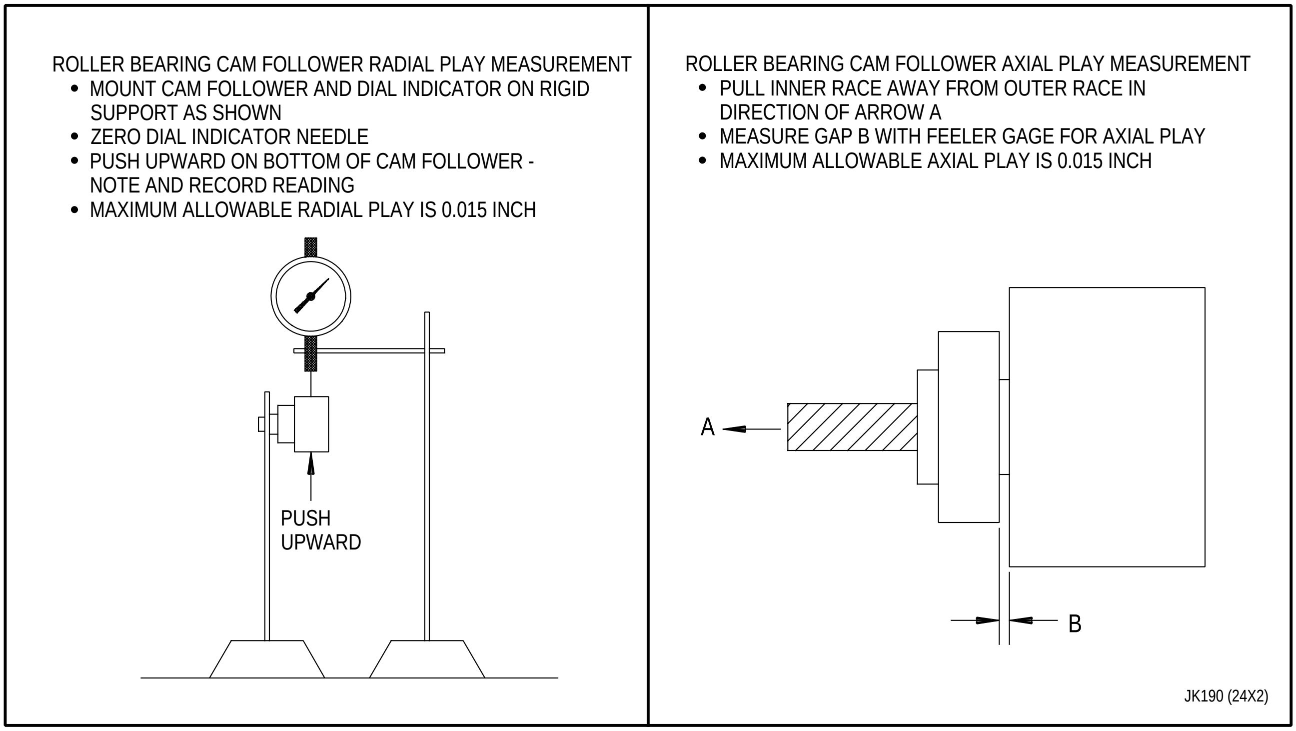


Figure 2. Recommended Inspection Technique For Radial and Axial Play of Augmentor Nozzle Roller Bearing Cam Follower

WORK PACKAGE

TECHNICAL PROCEDURES

SUPPORT, AUGMENTOR NOZZLE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 14

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 13	25	14 Blank	25		

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Support Assembly, Augmentor Nozzle - Repair	WP 424 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Alcohol, isopropyl	TT-I-735 or P-D-680, Type III

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	AUGMENTOR NOZZLE SUPPORT - INSPECTION	
	GAGE, AUGMENTOR NOZZLE SUPPORT GUIDE TRACK	PWA 56784

ILLUSTRATED SUPPORT EQUIPMENT

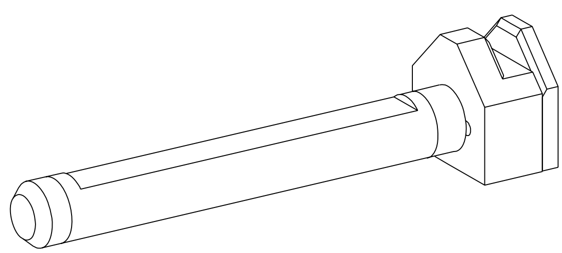


Figure T1. PWA 56784 GAGE

1. INTRODUCTION.

a. This work package contains instructions for inspection of the augmentor nozzle support.

1A. PRELIMINARY REQUIREMENTS.

NOTE

Temporary visco-elastic patches may be present on the skin of the augmentor nozzle support assembly provided the underlying crack has not propagated from underneath the patch.

a. Prior to inspection, remove temporary visco-elastic patches using the following procedure:

(1) Remove silicon rubber sealant using SPOP 704. Refer to T.O. 2-1-111.

(2) Peel off aluminum patch material.

(3) Remove remaining adhesive using isopropyl alcohol.

2. AUGMENTOR NOZZLE SUPPORT - INSPECTION.

(See Figure 1.)

a. Inspect augmentor nozzle support per figure 1. PWA 56784 gage may be used for guide wall wear minimum thickness check. Gage is no-go type and will fit onto guide lip if wear is beyond serviceable limit.

b. Fluorescent penetrant inspect cracks per figure 1. Refer to SPOP 70 per T.O. 2-1-111.

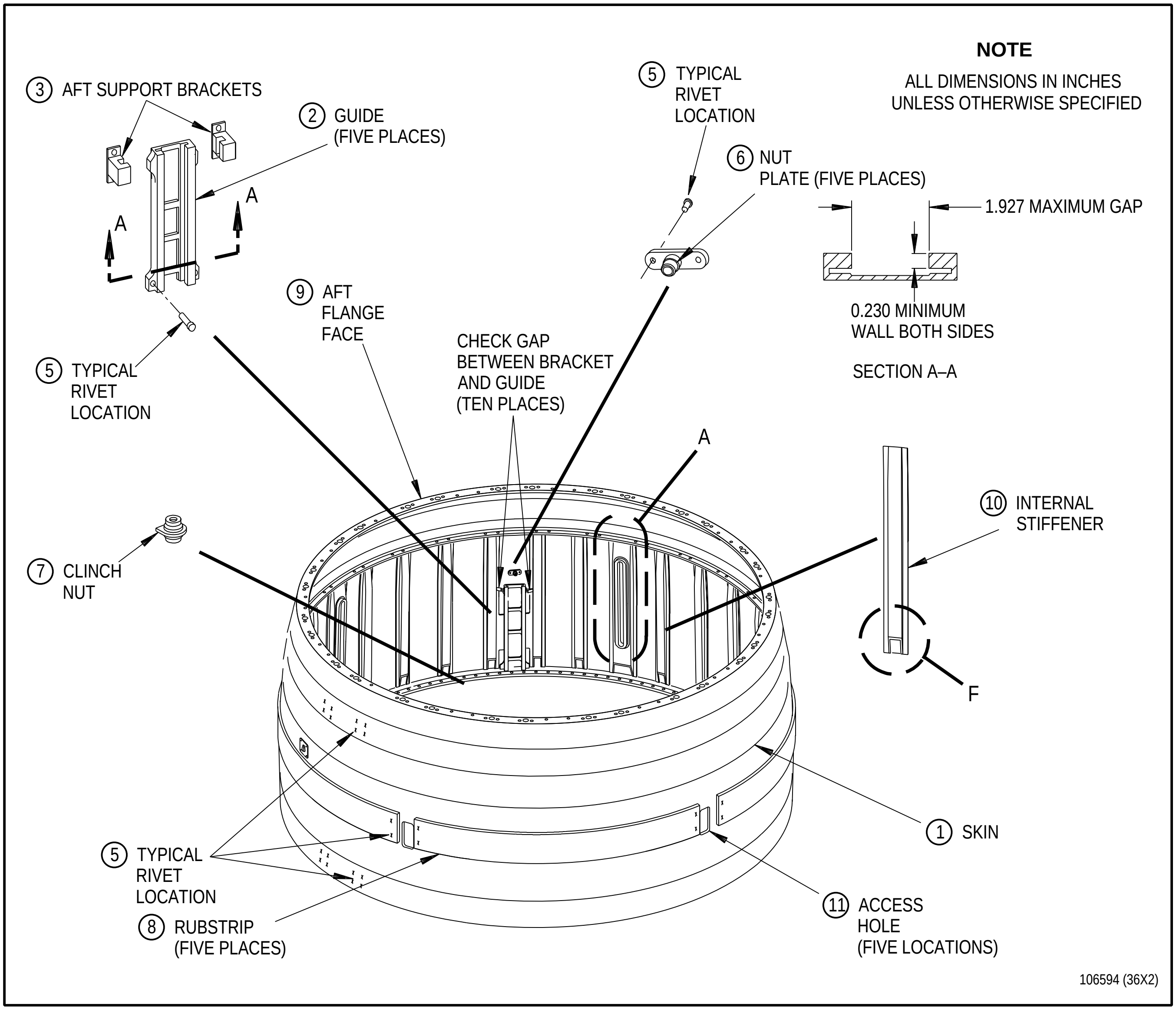


Figure 1. Augmentor Nozzle Support - Inspection (Sheet 1 of 4)

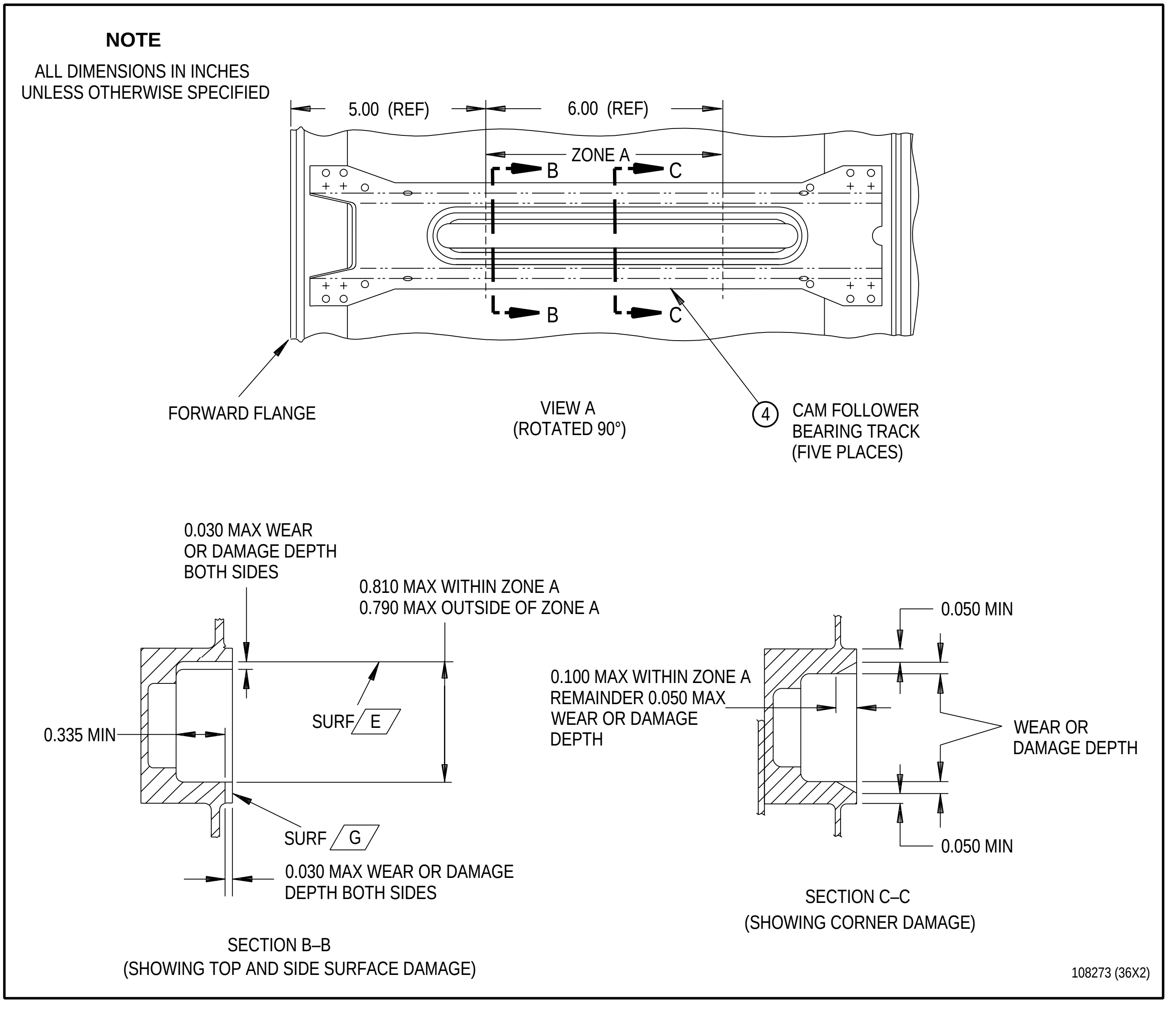


Figure 1. Augmentor Nozzle Support - Inspection (Sheet 2 of 4)

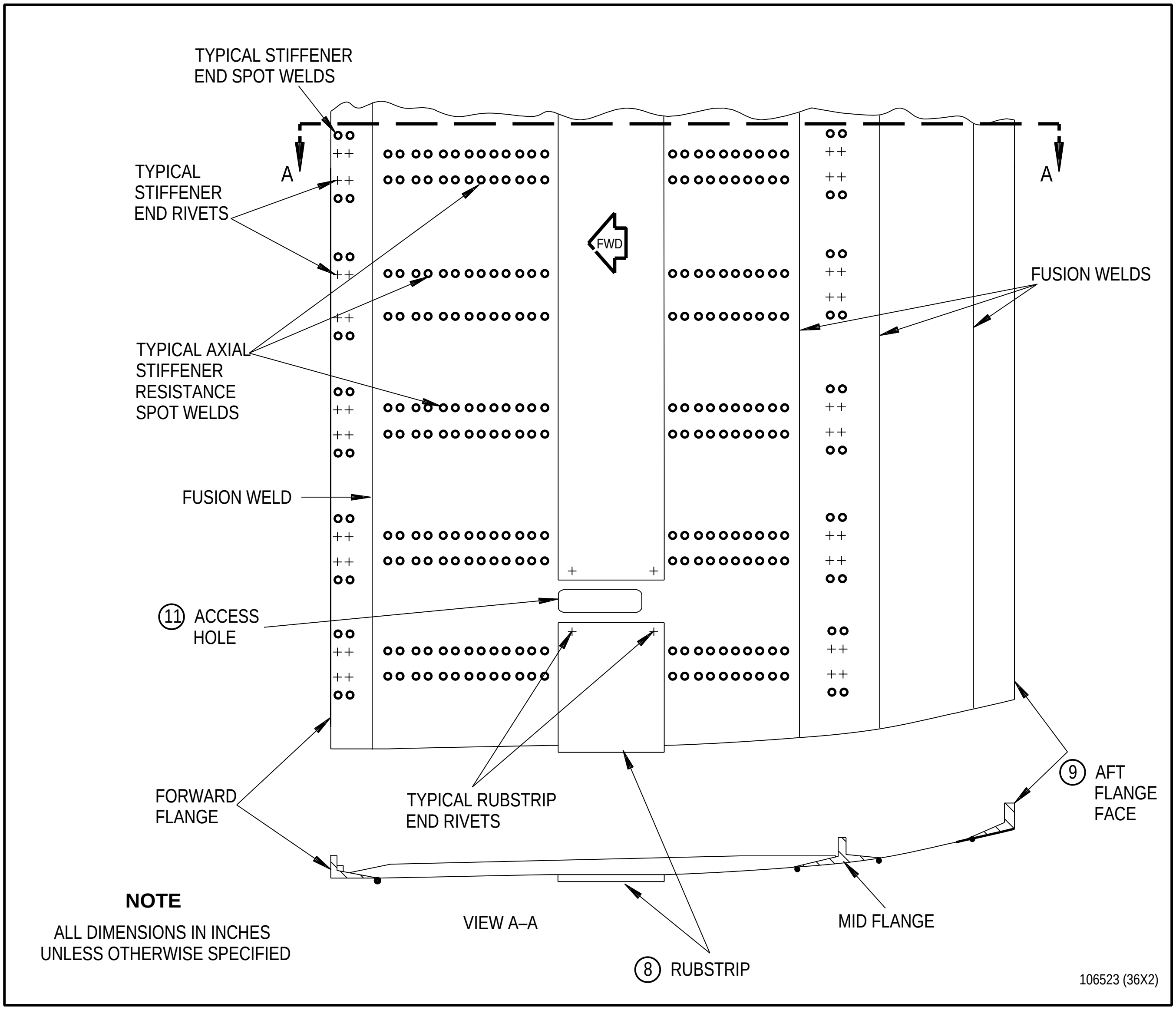


Figure 1. Augmentor Nozzle Support - Inspection (Sheet 3 of 4)

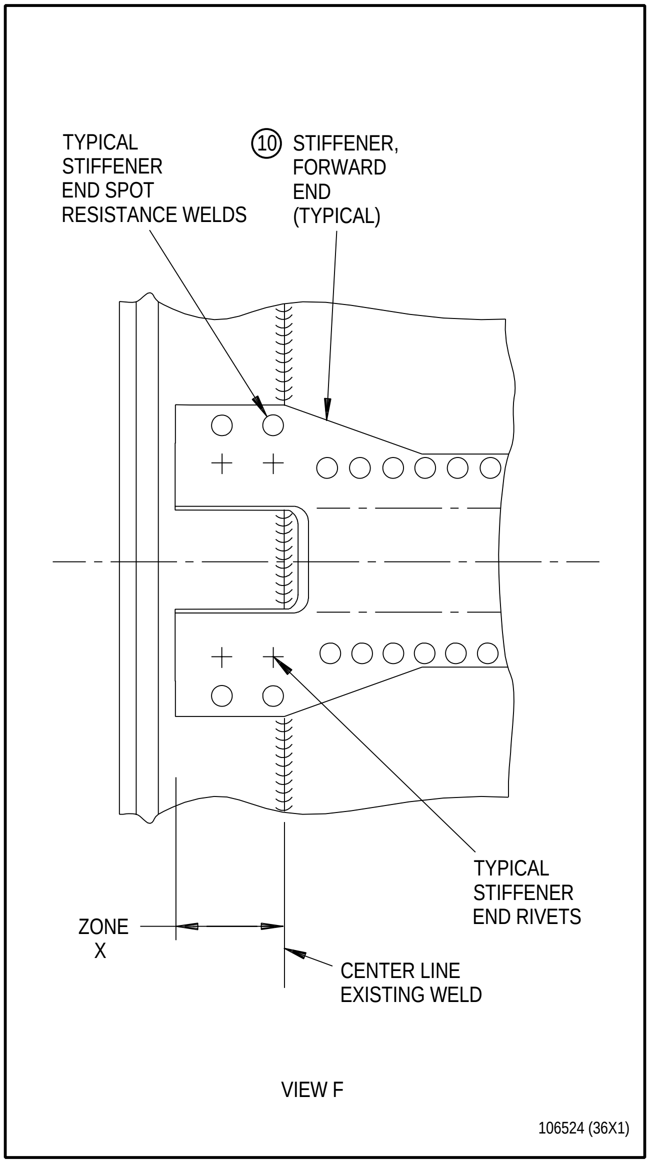


Figure 1. Augmentor Nozzle Support - Inspection (Sheet 4 of 4)

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Skin -			
Cracks not associated with punctures	Not serviceable	a. Any amount of following conditions are reparable provided corrective actions completely contain crack: • One-line cracks, including those extending into stiffener welds. • Multiple cracks extending into stiffener welds. • Damage around guides. • Cracks under axial stiffeners.	a. Patch repair per WP 424 00.
		b. Cracks are not permitted to terminate in circumferential flange fusion weld.	b. If damaged area of flange weldment cannot be removed and repaired per WP 424 00, replace support assembly.
Punctures from OD to ID (inward) with no internal damage	0.250 inch diameter hole or 0.500 inch long by 0.250 inch wide hole	Any amount provided corrective action completely contains damage.	Patch repair per WP 424 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limit	Maximum Reparable Limits	Corrective Action
1. Skin - (continued)			
Cracks originating from punctures	Not serviceable	a. Any number provided corrective action completely contains cracks.	a. Patch repair per WP 424 00.
		b. Cracks are not permitted to terminate in circumferential flange fusion weld.	b. If damaged area of flange weldment cannot be removed and repaired per WP 424 00, replace support assembly.
		c. Cracks that penetrate into skin from rubstrip are not reparable.	c. Replace nozzle support assembly per WP 424 00.
Dents without cracks or breaks	0.125 inch deep by 0.500 inch wide	Any amount provided skin can be recontoured.	Cold work dents into original contour per WP 424 00.
Drag marks, scratches and dents under axial stiffener, with or without cracks on OD surface	Dents 0.125 inch deep by 0.500 inch wide without cracks. Drag marks and scratches 0.500 inch wide without penetrating skin and without cracks.	Not reparable	Replace nozzle support assembly.
Distortion/ waviness	0.250 inch from peak to valley	Any amount provided skin can be recontoured.	Cold work dents into original contour per WP 424 00.
Wear or gouges under rubstrip	0.009 inch deep	Not reparable	Replace nozzle support assembly.

Legend for figure 1 (continued)

	Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2.	Guide -			
	Slot wear	1.927 inch maximum slot width	Any amount	Replace guide per WP 424 00.
	Wall wear	0.230 inch minimum	Any amount	Replace guide per WP 424 00.
	Nicks and scratches	Serviceable provided no raised metal.	0.062 inch deep	Blend to remove raised metal per WP 424 00. Replace guide exceeding maximum reparable limits per WP 424 00.
	Edge wear	0.100 inch maximum	Any amount	Replace guide per WP 424 00.
3.	Guide and aft sheet metal support brackets -			
	Missing/cracked welds	Not serviceable	Any amount	Replace brackets per WP 424 00.

NOTE

Radial gap between guide and support bracket may be measured by pushing guide outward against case (ten places).

	Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
	Wear (radial gap between guide and bracket)	Up to 0.030 inch gap	Any amount	Replace brackets per WP 424 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Cam follower bearing track -			
Slot wear (localized)	Not serviceable	0.030 inch both sides	Blend repair per WP 424 00. If damage exceeds reparable limits, replace nozzle support assembly.
Slot wear (entire length)	Section B-B, Sheet 2	Not reparable	Replace nozzle support assembly.
Cracks in stiffener	Not serviceable	Any number of cracks in cam follower bearing track stiffener welds or material but not under or within 0.500 inch of rubstrip.	Patch repair per WP 424 00.
Notch wear on corner	Not serviceable	Section C-C, Sheet 2.	Blend repair per WP 424 00. If damage exceeds reparable limits, replace nozzle support assembly per WP 424 00.
Localized surface damage	Not serviceable	0.030 inch both sides	Blend repair per WP 424 00. If damage exceeds reparable limits, replace nozzle support assembly per WP 424 00.
5. Rivets -			
Loose	Not serviceable	Not reparable	Replace rivets per WP 424 00.
6. Nut plate -			
Loose	Not serviceable	Not reparable	Replace rivets securing nut plate per WP 424 00.
Stripped or damaged threads	Not serviceable	Not reparable	Replace nut plate per WP 424 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
7. Clinch nuts -			
Stripped, damaged threads, or missing	Not serviceable	Not reparable	Replace clinch nuts per WP 424 00.

NOTE

Looseness may be measured by inserting feeler gage between clinch nut and flange surface.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Loose	Not serviceable	Not reparable	Replace clinch nuts per WP 424 00.
8. Rubstrip -			
Cracks around spotwelds, including edge cracks	Not serviceable	Any amount provided no rivets are required in center of rubstrip.	Rivet repair per WP 424 00.
Wear or gouges	0.005 inch deep	Any amount, including penetration into support skin up to 0.009 inch.	Replace rubstrip per WP 424 00.
Radial gap separating center of rubstrip from skin at circumferential ends.	0.065 inch	Any amount	Replace rubstrip per WP 424 00.
Antigalling compound missing	Not serviceable	Any amount	Replace antigalling compound per WP 424 00.
9. Aft flange face -			
Wear	0.050 inch deep	Not reparable	Replace nozzle support assembly.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
10. Internal stiffeners -			
Cracks	Not serviceable	See corrective action.	Patch repair per WP 424 00.
Cracks in forward ends (Zone X)	Up to 15 cracks per nozzle support assembly	Any amount provided cracks totally within Zone X.	Patch repair per WP 424 00.
11. Access holes -			
Nicks and cracks on edges	0.062 inch length provided any raised metal protrudes toward nozzle support assembly ID.	Up to 0.250 inch length.	Blend repair per WP 424 00.

WORK PACKAGE

TECHNICAL PROCEDURES

SUPPORT AND BEARING ASSEMBLY, AUGMENTOR NOZZLE ACTUATOR -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	9				
4 Blank	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection	T.O. 2J-F100-9
Introduction and General Information	T.O.2J-F100-53-1
Inspection, Fluorescent Penetrant, General	SWP 071 03
Augmentor Duct and Nozzle Module	T.O.2J-F100-53-10
Cleaning	WP 201 00
Support, Augmentor Nozzle Actuator - Repair	WP 425 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

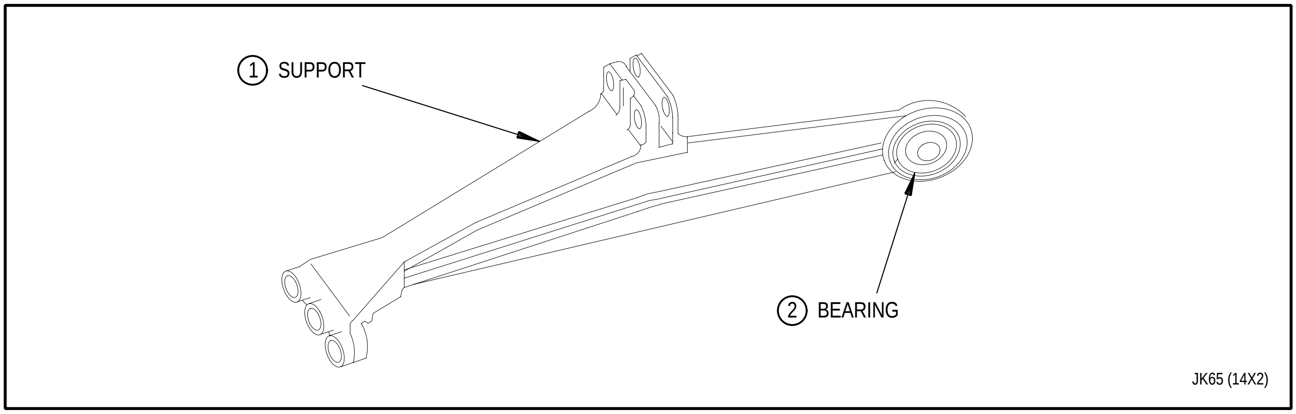
a. This work package contains instructions for inspection of augmentor nozzle actuator support and the augmentor nozzle actuator support bearing.

2. AUGMENTOR NOZZLE ACTUATOR SUPPORTS AND AUGMENTOR NOZZLE ACTUATOR SUPPORT BEARINGS - INSPECTION.

(See Figure 1.)

a. Fluorescent penetrant inspect for cracks per T.O. 2J-F100-9. No cracks allowed. Refer to T.O. 2J-F100-53-1, SWP 071 03.

b. Visually inspect. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Support -			
Cracks	Not serviceable	Not reparable	Replace augmentor nozzle actuator support.
2. Bearing -			
Binding, or seized	Not serviceable	Any amount	Clean bearing per WP 201 00. Replace bearing per WP 425 00 if cleaning does not remove condition.

Figure 1. Augmentor Nozzle Actuator Supports and Support Bearing - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

SEAT, HELICAL COMPRESSION SPRING -

UNSCHEDULED INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Assembly	WP 701 00
Disassembly	WP 011 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for unscheduled inspection of helical compression spring seat.

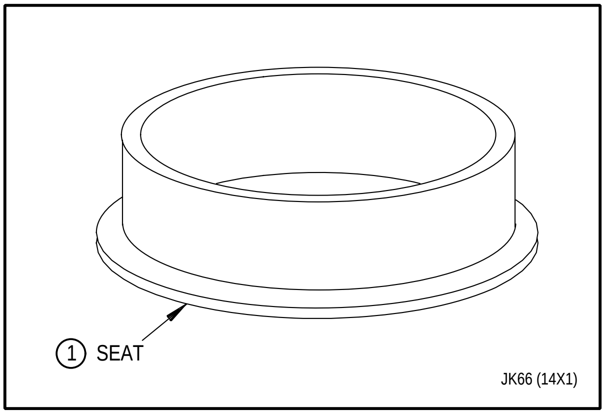
2. PRELIMINARY INSTRUCTIONS.

a. Remove helical compression spring seat per WP 011 00.

3. HELICAL COMPRESSION SPRING SEAT - INSPECTION.

(See Figure 1.)

a. Visually inspect helical compression spring seat. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Seat -			
Wear	0.020 inch deep	Not reparable	Replace seat.
Cracks	Not serviceable	Not reparable	Replace seat.

Figure 1. Helical Compression Spring Seat - Inspection

4. FOLLOW-ON MAINTENANCE.

a. Install helical compression spring seat per WP 701 00.

WORK PACKAGE

TECHNICAL PROCEDURES

FINGER VALVE, AUGMENTOR -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

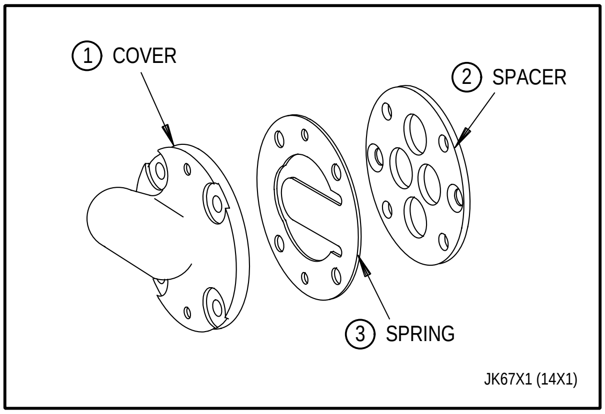
1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor finger valve.

2. AUGMENTOR FINGER VALVE - INSPECTION.

(See Figure 1.)

a. Visually inspect finger valve.
   See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Cover -			
Cracks	Not serviceable	Not reparable	Replace cover.
2. Spacer -			
Cracks	Not serviceable	Not reparable	Replace spacer.
3. Spring -			
Lack of free travel	Not serviceable	Not reparable	Replace spring.
Burns	Not serviceable	Not reparable	Replace spring.
Bent	Not serviceable	Not reparable	Replace spring.

Figure 1. Augmentor Finger Valve - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

DUCT, AUGMENTOR COMBUSTION CHAMBER - (TYPICAL PN 4073475)

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	19	4	19	5 - 7	17
2 - 3	16			8	19

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Nondestructive Inspection	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
FLUORESCENT PENETRANT (PMC 9519)	ZYGLO ZL-15B

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor combustion chamber duct.

2. AUGMENTOR DUCT ASSEMBLY - INSPECTION.

(See Figure 1.)

a. Inspect augmentor duct per figure 1 as follows:

CAUTION

To prevent material damage from fluid entrapment, do not immerse duct in fluorescent penetrant inspection fluid.

. Nondestructive inspect localized augmentor duct inner and outer surfaces where cracking is suspected. Refer to T.O. 2J-F100-9 and T.O. 2-1-111, Section VIII, SPOP 70.

. With spray or brush, apply PMC 9519 penetrant to localized area. See figure 1 for crack limits.

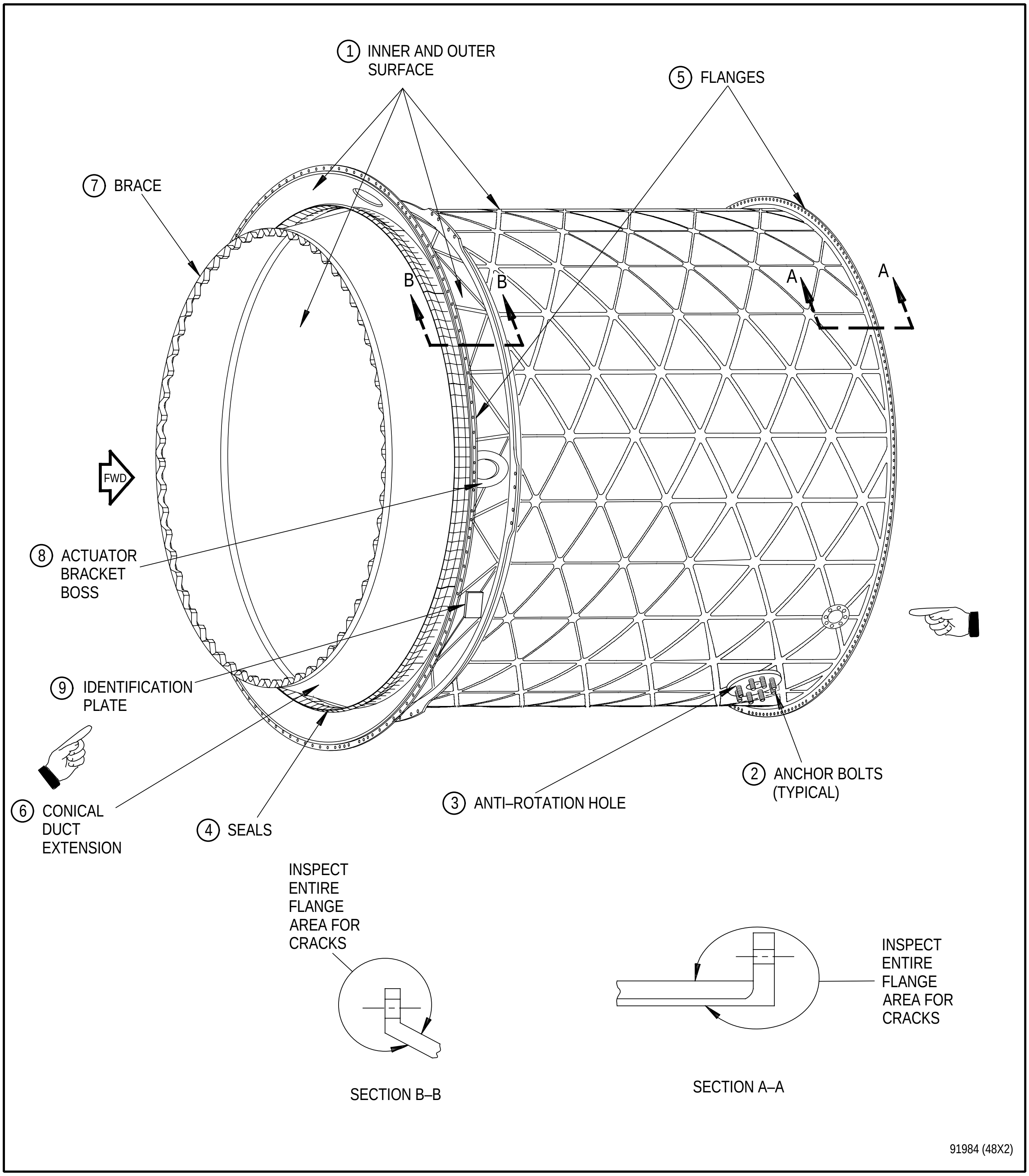


Figure 1. Augmentor Duct Assembly - Inspection

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Inner and outer surfaces -			
Dents	0.025 inch deep by 5.00 inches long by 0.125 inch wide	Not reparable	Replace augmentor duct assembly
Round bottom dents	0.020 inch deep by greatest dimension not exceeding 0.750 inch diameter	Not reparable	Replace augmentor duct assembly
Cracks or punctures all over	Not serviceable	Not reparable	Replace augmentor duct assembly
Scratches or rubmarks on panels	Not serviceable	0.022 inch minimum wall thickness	Blend per WP 428 00.
Scratches or rubmarks on all areas of duct except panels	Not serviceable	0.002 inch maximum depth	Blend per WP 428 00.
Loose rivet at duct, seal, and conical duct extension attachment	Not serviceable	See corrective action	Remove loose rivet per T.O. 2-1-111 and inspect hole for elongation.
Elongated rivet holes at duct, seal, and conical duct extension attachment area	Not serviceable	Dimension across hole may not exceed 0.132 inch	If hole measures less than 0.132 inch across, repair per WP 428 00, provided no cracks are present. If cracks are present or hole measures greater than 0.132 inch, replace part.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Anchor bolts -			
Stripped or damaged threads	Chasing of slightly damaged threads is permissible provided self-locking friction is not lost with mating nut	See corrective action for bolts beyond serviceable limits.	Replace augmentor duct assembly
3. Anti-rotation hole -			
Wear	Maximum hole diameter 0.324 inch	Not reparable	Replace augmentor duct assembly
4. Seal -			
Wear	Any amount provided no wear through the hardcoat	Not reparable	Replace seal per WP 428 00
Cracks	Not serviceable	Not reparable	Replace seal per WP 428 00
Missing finger seal	Not serviceable if any portion is missing	Not reparable	Replace seal per WP 428 00
Elongated rivet holes	Not serviceable	Dimension across hole may not exceed 0.132 inch	If hole measures less than 0.132 inch across, repair per WP 428 00, provided no cracks are present. If cracks are present or hole measures greater than 0.132 inch, replace part.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
5. Flanges -			
Cracks	Not serviceable	Not reparable	Replace duct
Nicks, dents	Not serviceable	Not reparable	Replace duct
Distortion	Not serviceable	Not reparable	Replace duct
6. Conical duct extension -			

NOTE

Any amount of wear not completely worn through metal is serviceable.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
Worn through areas	Maximum dimensions of any worn through area are 0.250 inch by 0.120 inch	Not reparable	Replace conical duct extension per WP 428 00.
Cracks	Not serviceable	a. Cracks under 1.00 inch long originating from wear areas are reparable.	a. Stop drill crack using 0.125 inch diameter drill
		b. Cracks over 1.00 inch long	b. Replace conical duct extension per WP 428 00.
Brace pulled away from duct extension	Not serviceable	Not reparable	Replace conical duct extension per WP 428 00.
Elongated or cracked rivet holes at duct, seal, and conical duct extension attachment area	Not serviceable	Any amount	Repair cracked or elongated rivet holes per WP 428 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
7. Brace -			
Cracks	Maximum of two cracks partially or completely through brace provided they are separated from each other by 45 degrees or 14.20 inches minimum distance at the circumference.	Not reparable	Replace conical duct extension per WP 428 00.
8. Actuator Bracket Boss -			
Wear, scratches and rubmarks	Not serviceable	Any amount	Blend any raised metal.
Cracks	Not serviceable	Not reparable	Replace duct.
9. Identification plate -			
Missing, damaged	Not serviceable	Not reparable	Replace plate per WP 428 00.

WORK PACKAGE

TECHNICAL PROCEDURES

CONNECTING LINK ASSEMBLY, RIGID, BALANCE NOZZLE SEGMENT -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection	T.O. 2J-F100-9
Introduction and General Information	T.O. 2J-F100-53-1
Cleaning, Alkaline Rust Remover, Quick Soak (SPOP 18)	WP 036 00
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Cleaning	WP 201 00
Bearing, Spherical Plain, Balance Nozzle Segment Rigid Connecting Link - Inspection	WP 316 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

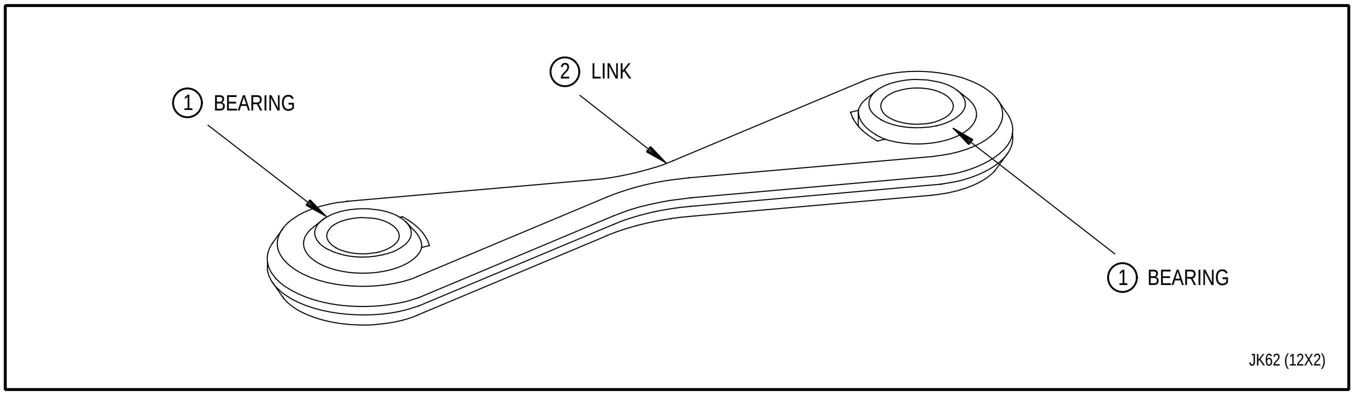
a. This work package contains instructions for inspection of balance nozzle segment rigid connecting link assembly.

2. BALANCE NOZZLE SEGMENT RIGID CONNECTING LINK ASSEMBLY - INSPECTION.

(See Figure 1.)

a. Inspect connecting link assembly. See figure 1.

b. Fluorescent penetrant inspect. Refer to T.O. 2J-F100-9. No cracks allowed.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
NOTE Individual bearing inspection per WP 316 00			
1. Bearing -			
Seized	Not serviceable	Any amount	Clean link assembly or bearing. See WP 201 00. Replace bearing if cleaning does not remove condition or if bearing will not rotate freely.
2. Link -			
Cracks	Not serviceable	Not reparable	Replace link assembly.

Figure 1. Balance Nozzle Segment Rigid Connecting Link Assembly - Inspection

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WORK PACKAGE

TECHNICAL PROCEDURES

BEARING, FLANGED SLEEVE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

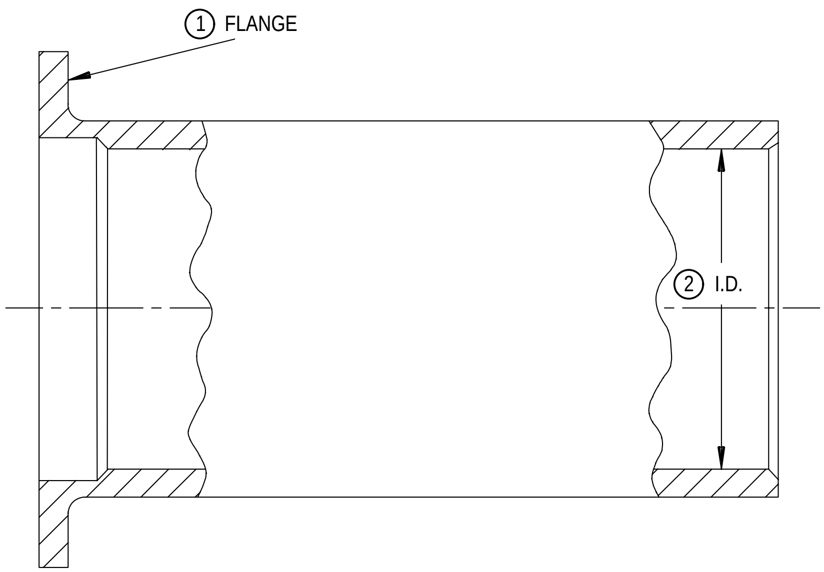
1. INTRODUCTION.

a. This work package contains instructions for inspection of flanged sleeve bearing.

2. FLANGED SLEEVE BEARING - INSPECTION.

(See Figure 1.)

a. Inspect flanged sleeve bearing.
   See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Flange -			
Cracking and breaking	Not serviceable	Not reparable	Replace bearing.
2. I.D. -			
Wear	I.D. up to 0.636 inch.	Not reparable	Replace bearing.

Figure 1. Flanged Sleeve Bearing - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

PIN, AUGMENTOR CONVERGENT NOZZLE SEGMENT -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	9				
3	0				
4	9				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cloth, abrasive, crocus	P-C-458, GSA

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

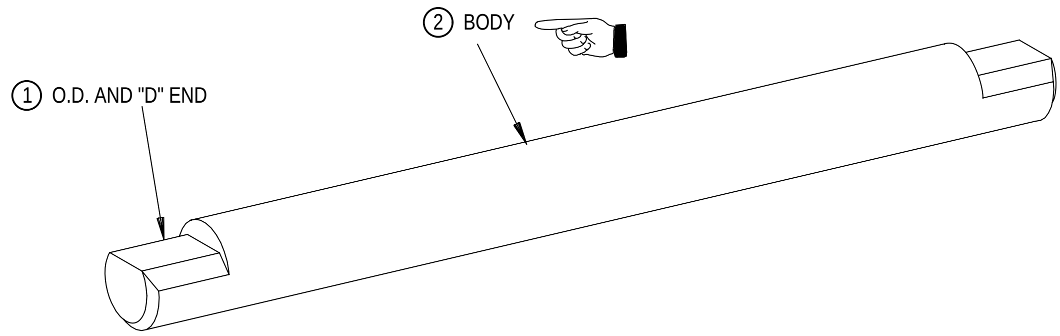
1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor convergent nozzle segment pin.

2. AUGMENTOR CONVERGENT NOZZLE SEGMENT PIN - INSPECTION.

(See Figure 1.)

a. Inspect pin. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. O.D. and "D" End -			
Light galling	Serviceable within following conditions: • High spots or burrs are removed with crocus cloth • Diameter of pin is larger than 0.618 inch • Height of "D" end is greater than 0.465 inch	Not reparable	Replace pin.
Bending	Pin shall be straight within 0.004 inch	Not reparable	Replace pin.
2. Pin body			
Light oxidation	Not serviceable	0.005 inch depth	Remove all oxidation with crocus cloth. Replace pin exceeding reparable limit.

Figure 1. Augmentor Convergent Nozzle Segment Pin - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

NOZZLE SEGMENT, EXTERNAL, AUGMENTOR -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	26	2 - 8	12	9 - 10	26

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor external nozzle segment assembly.

2. AUGMENTOR EXTERNAL NOZZLE SEGMENT ASSEMBLY - INSPECTION.
(See Figure 1.)

a. Visually inspect per figure 1.

b. Superficial and shallow imperfections are acceptable.

c. Resin discolorations of black, brown, or gray are acceptable.

d. Any amount of resin crazing and hairline flaws are acceptable.

e. A wavy surface appearance is acceptable provided changes have a smooth transition.

f. Dashed tracer lines on parts are acceptable. When fibers are missing in tracer lines, resulting depressions are also acceptable.

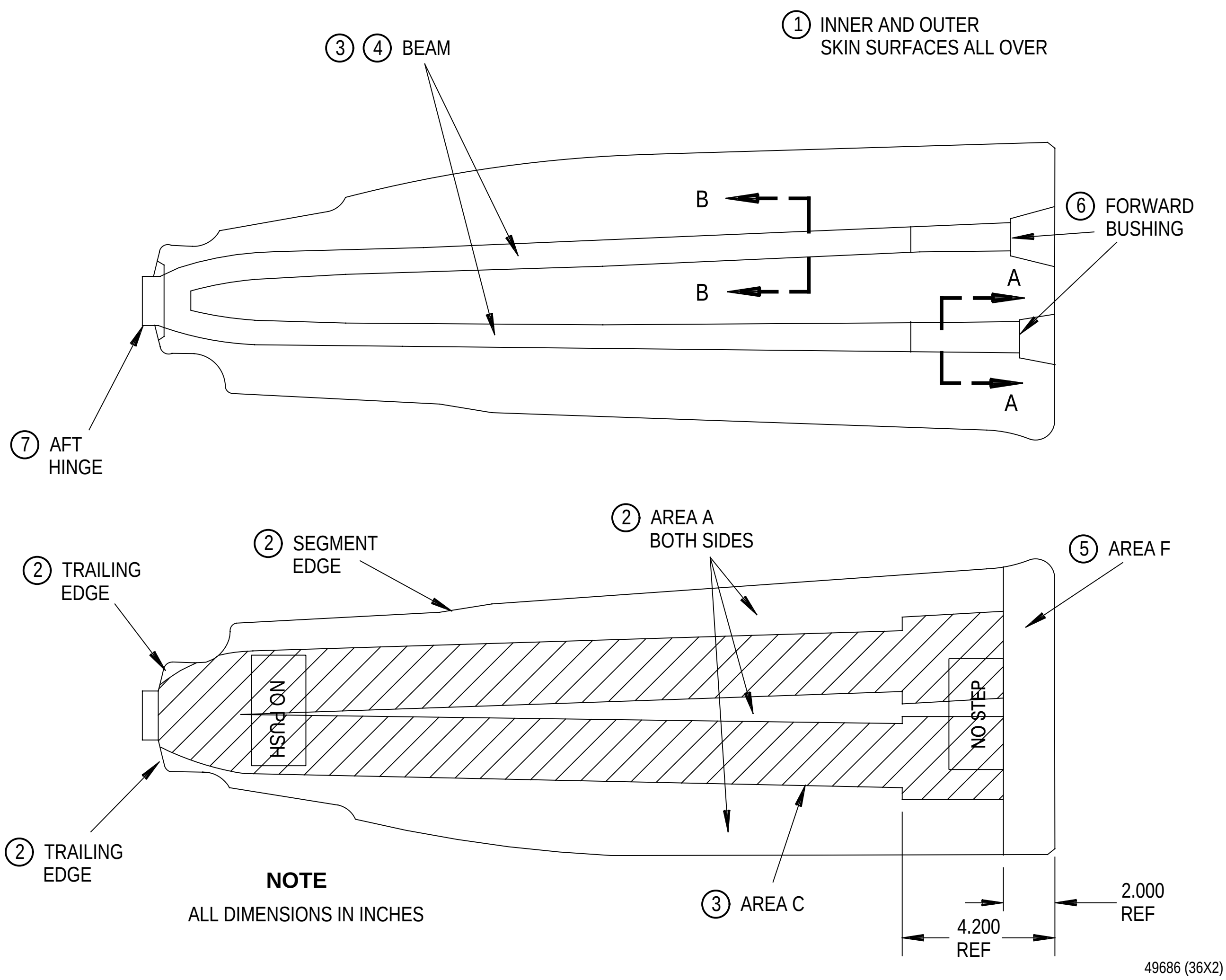


Figure 1. Augmentor External Nozzle Segment - Inspection (Sheet 1 of 2)

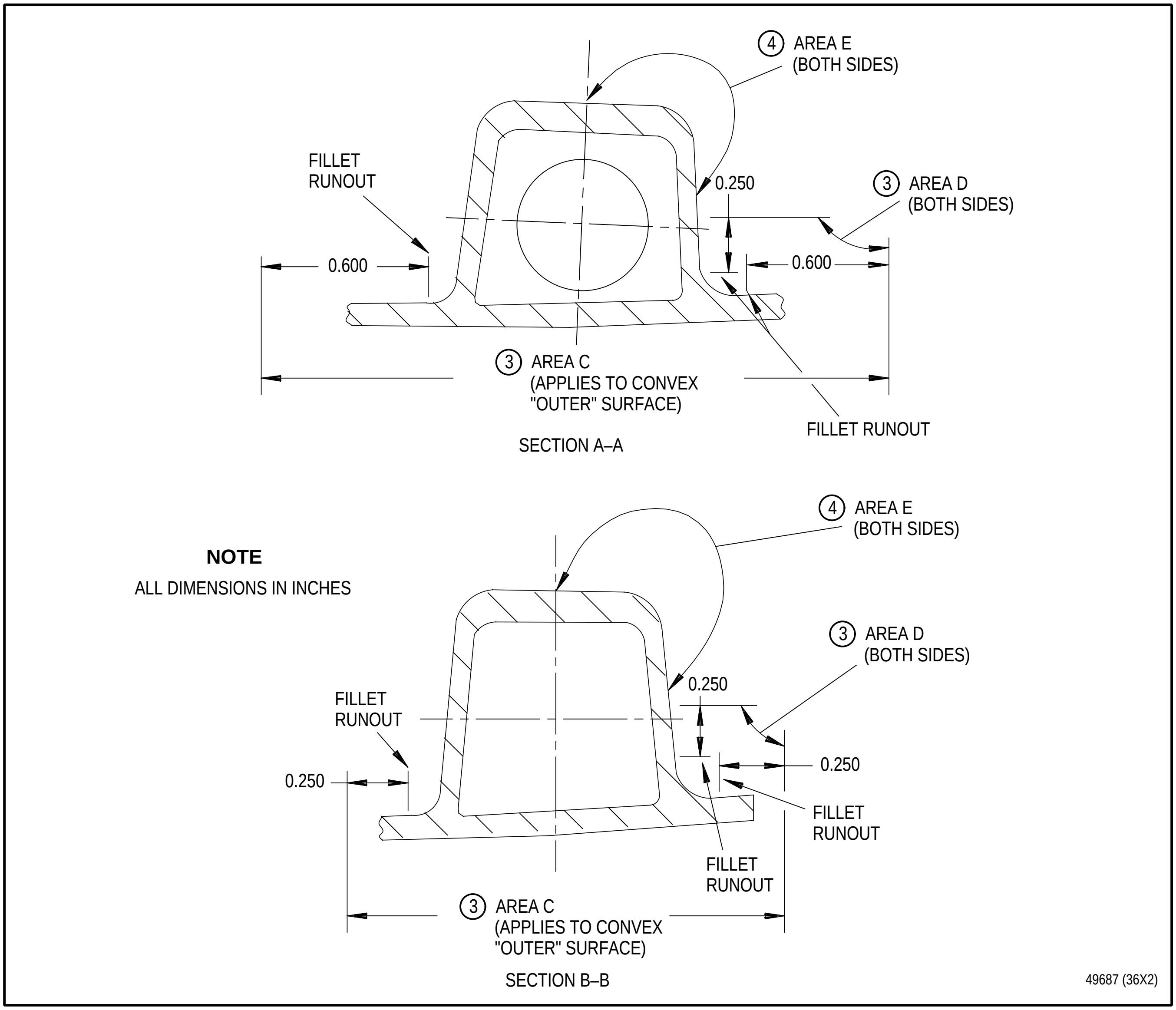


Figure 1. Augmentor External Nozzle Segment - Inspection (Sheet 2 of 2)

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Inner and outer skin surfaces including beam -			
Resin chipping	1.0 square inch. 5.0 square inch total area per part (both sides). There shall be no evidence of missing graphite fiber.	Any amount provided repair does not extend into Area C or D.	Repair per WP 416 00.
Toolmarks, gouges	5 places on part with 0.010 maximum depth and maximum area of 0.248 square inch.	Any amount provided repair does not extend into Area C or D.	Repair per WP 416 00.
2. Area A (Skin) -			
Missing, peeled plies	Not serviceable	Any amount provided repair does not extend into Area C or D.	Repair per WP 416 00.
Resin blister	0.020 inch height. 5 places total per part separated by 0.500 inch minimum. Maximum diameter of blister allowed is 0.500 inch. Maximum area of blisters allowed is 0.250 square inch.	Not reparable	Replace external nozzle segment.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Area A (Skin) - continued			
Chafing, wear, abrasion, erosion	Up to a depth of 0.012 inch (through one ply)	Any amount provided damage and repair does not extend into Areas C or D.	Repair per WP 416 00.
Delaminations	Maximum dimension cannot exceed 0.500 inch in length or width.	Any amount provided damage and repair does not extend into Areas C or D.	Repair per WP 416 00.
Scratches	Any amount up to a depth of 0.012 inch (through one ply)	Any amount provided repair does not extend into Area C or D.	Repair per WP 416 00.
Penetration	Not serviceable	Any amount provided repair does not extend into Area C or D.	Repair per WP 416 00.
Cracks, tears (except craze cracks)	Not serviceable	Any amount provided repair does not extend into Area C or D.	Repair per WP 416 00.
Edge delamination	0.500 inch along edge or 0.500 inch into segment. No frayed fibers allowed.	Any amount provided repair does not extend into Area C or D.	Repair per WP 416 00.
Edge nicks and splintering	Up to 0.250 inch indentation in original edge contour. No frayed fibers or sharp corners allowed.	Any amount provided repair does not extend into Area C or D.	Repair per WP 416 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Area C & D (Beam) -			
Surface nicks, abrasion, scratches	Any amount provided no damage has occurred to surface fibers. (i.e., frayed, interrupted, exposed, etc.)	Not reparable	Replace external nozzle segment.
Cracks, tears, delaminations, splintering, penetration, gouges and other damage (except craze cracks)	Not serviceable	Not reparable	Replace external nozzle segment.
Resin blister	0.020 inch height. 5 places total per part separated by 0.500 inch minimum. Maximum diameter of blister allowed is 0.500 inch. Maximum area of blisters allowed is 0.250 square inch.	Not reparable	Replace external nozzle segment.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Area E (Beam) -			
Cracks, tears, delaminations, splintering, penetration, and buckled (except craze cracks)	Not serviceable	Not reparable	Replace external nozzle segment.
Gouges	Not serviceable	Not reparable	Replace external nozzle segment.
Surface nicks, abrasions, scratches	Any amount provided damage does not exceed 0.010 inch depth.	Not reparable	Replace external nozzle segment.
Resin blister	0.020 inch height. 5 places total per part separated by 0.500 inch minimum. Maximum diameter of blister allowed is 0.500 inch. Maximum area of blisters allowed is 0.250 square inch.	Not reparable	Replace external nozzle segment.
5. Area F -			
Wear from finger seals	Any amount provided wear does not extend to a depth greater than 0.010 inch and fibers are not frayed or create an interrupted surface.	Any amount providing damage does not exceed 0.018 inch depth.	Repair per WP 416 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
6. Forward bushings -			
Wear or elongation	Serviceable up to a hole diameter of 0.475 inch. Measurement to be taken beyond chamfer.	Not reparable	Replace external nozzle segment.
Loose, cracked or broken	Not serviceable	Not reparable	Replace external nozzle segment.
Resin chipping	Serviceable up to 0.150 inch deep around hole	Not reparable	Replace external nozzle segment.
7. Aft hinge -			
Cracked or broken	Not serviceable	Not reparable	Replace external nozzle segment.
Side face wear	Serviceable up to 0.020 inch deep.	Not reparable	Replace external nozzle segment.
Hole elongation	Minimum hole wall thickness of 0.080 inch.	Not reparable	Replace external nozzle segment.
Loose	Not serviceable	Not reparable	Replace external nozzle segment.
Tool marks, scratches, nicks	Serviceable up to 0.020 inch deep.	Not reparable	Replace external nozzle segment.

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL, AUGMENTOR NOZZLE SUPPORT -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	9				
3	0				
4	9				
5 Deleted	9				
6 Blank Deleted	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection	T.O. 2J-F100-9
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Seal, Augmentor Nozzle Support	WP 433 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

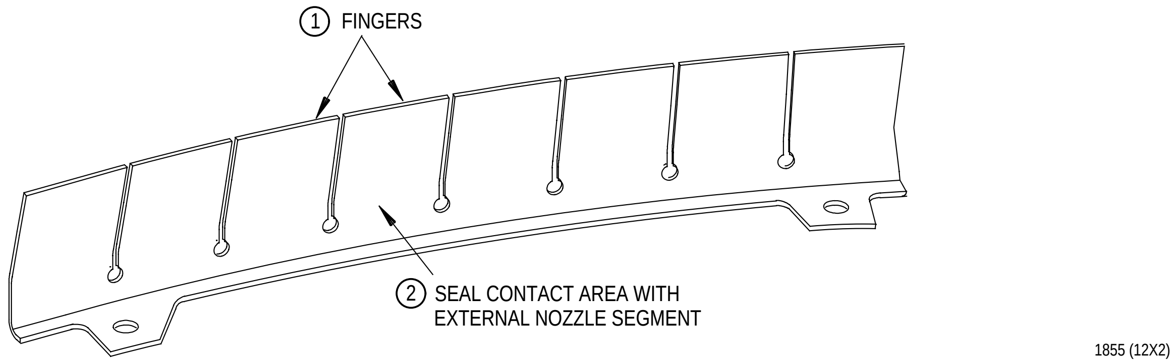
1. INTRODUCTION.

a. This work package contains instructions for inspection of augmentor nozzle support seal.

2. AUGMENTOR NOZZLE SUPPORT SEAL - INSPECTION.
(See Figure 1.)

a. Visually inspect seal. See figure 1.

b. Fluorescent penetrant inspect. Refer to T.O. 2J-F100-9. No cracks allowed.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Fingers -			
Missing	Not serviceable	Not reparable	Replace seal.
Nicks, tears and cracks on edges and corners	Not serviceable	Any number provided blend does not exceed 0.250 inch in depth.	Blend all nicks, tears and cracks. Replace seal exceeding reparable limits per WP 433 00.
All other cracks	Not serviceable	Not reparable	Replace seal.
2. Seal contact area with external nozzle segment -			
Wear (measure axial length of seal from augmentor duct)	Minimum serviceable length is 1.500 inches without knife-edge. (Original seal length is 1.700 inches.)	1.500 inches minimum seal length after knife-edge removal	Blend off knife-edge removing all sharp edges per WP 433 00. Replace seal exceeding reparable limits.

Figure 1. Augmentor Nozzle Support Seal - Inspection

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WORK PACKAGE

TECHNICAL PROCEDURES

BEARING, PLAIN, ROD END, EXTERNAL NOZZLE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	17	5	17	7 Added	15
2	15	6	15	8 Blank Added	15
3 - 4	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Augmentor Duct and Nozzle Module - Cleaning	WP 201 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	AUGMENTOR EXTERNAL NOZZLE ROD END BEARINGS - INSPECTION	
	GAGE, RIGID CONNECTING LINK BRG AXIAL AND RADIAL PLAY	PWA 56640

ILLUSTRATED SUPPORT EQUIPMENT

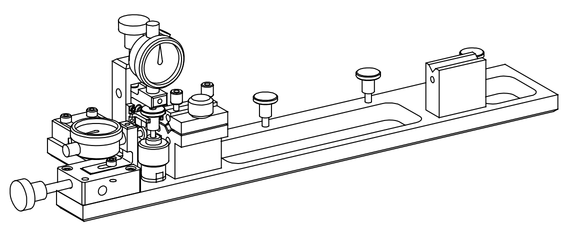


Figure T1. PWA 56640 GAGE

1. INTRODUCTION.

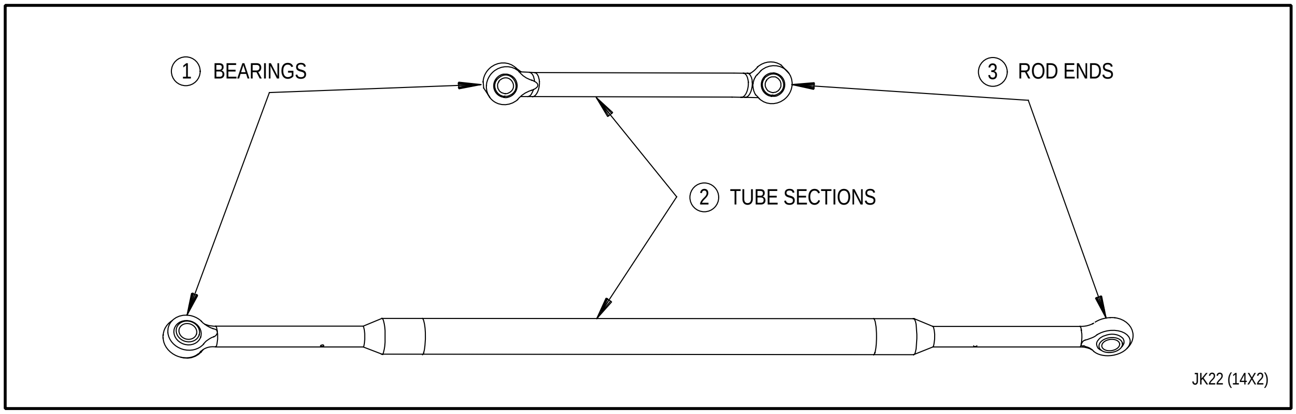
a. This work package contains instructions for inspection of augmentor external nozzle rod end bearings.

2. AUGMENTOR EXTERNAL NOZZLE ROD END BEARINGS - INSPECTION.

(See Figures 1, 2, and 3.)

a. Inspect connecting links. See figure 1.

b. If bearings are dirty, clean links per WP 201 00 before reusing.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action

NOTE

- Radial play is defined as clearance between bearing ball and race in a direction perpendicular to bore of ball.
- Axial play is defined as clearance between bearing ball and race in same direction as bore of ball.

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Bearing -			
Radial play	0.010 inch	Not reparable	Replace link.
Axial play	0.015 inch	Not reparable	Replace link.

Figure 1. Augmentor External Nozzle Rod End Bearings - Inspection

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Bearing - (continued)			
Pitting	Not serviceable	Not reparable	Replace link.
Corrosion, abrasive foreign material between bearing ball and race	Not serviceable	Correction by cleaning only	Hand work and clean bearing per WP 201 00. If bearing rotates freely after cleaning, it is serviceable. Replace link if condition cannot be corrected.
2. Tube section -			
Bent, buckled, flat spots, cracked	Not serviceable	Not reparable	Replace link.
Weld cracks	Not serviceable	Not reparable	Replace link.
3. Rod ends -			
Bent, cracked	Not serviceable	Not reparable	Replace link.
Wear, rod end faces or spherical OD	0.005 inch	0.010 inch	Hand blend wear area to remove any raised metal

c. Prepare PWA 56640 gage fixture by ensuring gage holder assembly, dial indicators, and V-block cover are retracted away from V-block and loading path. The round pusher shall be threaded half way to down position, and indicator support raised to highest position. Pins shall be in their storage locations.

d. Place connecting link into V-block cradle and, depending on length, rear V-block.

NOTE

Correct pin determined by ID of self-aligning bearing in connecting link.

(1) Align bore of self-aligning bearing with pin hole in pusher, by installing pin (1 of 3 depending on bore diameter) through bore of bearing and threading into shaft pin hole.

NOTE

Connecting links shall be cleaned prior to inspection.

e. Inspect axial wear as follows:

NOTE

Pin must be free to ensure repeatability.

(1) Secure connecting link in V-block by closing top cover and tightening hand knob. To prevent pin from binding, lift pin when tightening V-block, and ensure spring will pull pin back down. This will allow repeatability.

(2) Thread pin into shaft pin hole until contact is made with upper surface of self-aligning bearing. Turn two additional rotations after contact has been made to assure loading bearing OD downward against ID journal of connecting link.

(3) Loosen rear gage assembly lock nut and slide assembly forward to scribed line AXIAL. Dial indicator will not be located at center of pin, nor will stabilizer be engaged with pin. Tighten lock nut.

(4) Adjust vertical hand knob to lower gage holder and dial indicator until contact is made between dial indicator stem and pin. Rotate dial bezel to ZERO indicator.

(5) Rotate pusher counter-clockwise to overcome spring pressure and load self-aligning bearing upward against ID journal of connecting link.

(6) Note dial indicator reading, if reading exceeds T.O. limits, replace link.

(7) Adjust vertical hand knob to raise gage holder and dial indicator stem and pin.

(8) Rotate pusher clockwise to release spring pressure and unload self-aligning bearing.

f. Inspect radial wear as follows:

(1) Secure connecting link into V-block cradle by closing top cover and tightening hand knob finger tight but loose enough to allow axial movement of the connecting link in V-block.

NOTE

For smaller shaft diameter connecting links, two additional knob assemblies shall be threaded into cover until swivel foot contacts link OD, holding link in place.

(2) Slide rear gage assembly block forward to scribed mark RADIAL, so stabilizer engages pin (this prevents pin from rocking from side to side).

(3) Pull connecting link away from horizontal dial indicator and lock connecting link into place by further tightening hand knob, or depending on shaft diameter, two smaller knobs.

(4) Move gage holder with dial indicator toward end of connecting link by turning hand knob until indicator stem contacts link. Rotate dial bezel to ZERO indicator.

(5) Loosen V-block hand knob(s) to allow movement of connecting link and push link toward dial indicator. Note dial indicator reading, if reading exceeds T.O. limits, replace link.

(6) Restore fixture to initial setup position and remove released connecting link.

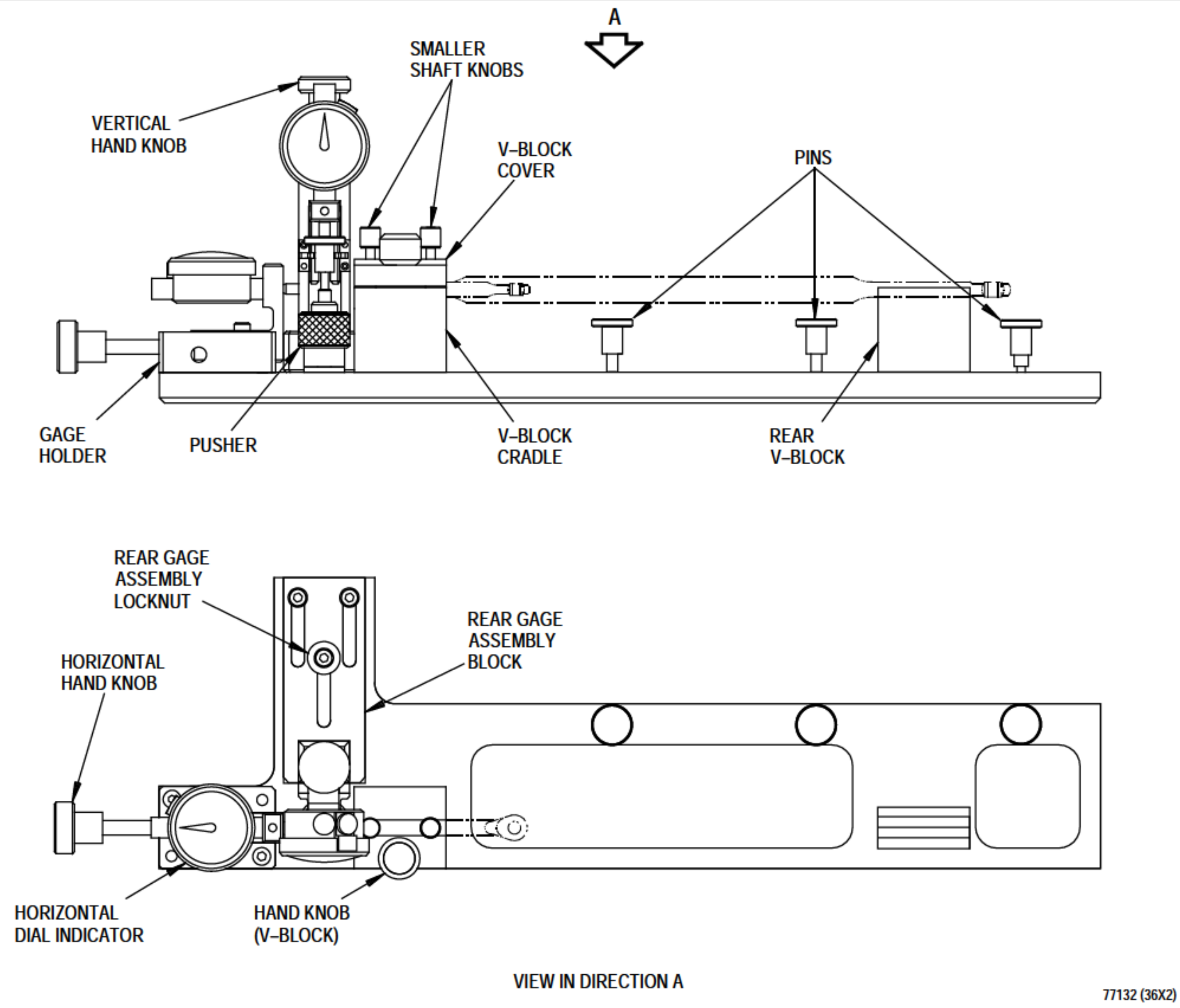


Figure 2. Augmentor External Nozzle Rod End Bearings - Radial and Axial Wear Inspection Using PWA 56640 Gage

Figure 3 deleted.

WORK PACKAGE

INTRODUCTION

AUGMENTOR DUCT AND NOZZLE MODULE -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	19	2	0	3 - 4	19

1. INTRODUCTION.

a. This work package introduces 400 00 through 599 00 series of work packages for augmentor duct and nozzle module parts - repair. The following work packages are included in this series.

WP No.	Title
401 00	Repair - General
402 00	Bearing, Augmentor Nozzle Lever - Repair
403 00	Liner, Augmentor Combustion Chamber - Repair
404 00	Open
405 00	Seal Assembly, Augmentor Divergent Nozzle Segment - Repair
406 00	Open
407 00	Seal Assembly, Augmentor Convergent Nozzle Segment - Repair
408 00	Liner Assembly, Augmentor Convergent Nozzle Segment Seal - Repair
409 00	Seal, Augmentor Balance Nozzle Segment - Repair
410 00	Nozzle Segment, Convergent, Augmentor - Repair
411 00 through 412 00	Open
413 00	Liner, Augmentor Convergent Nozzle Segment - Repair
414 00	Nozzle Segment, Divergent, Augmentor - Repair
415 00	Nozzle Segment, Balance, Augmentor - Repair
416 00	Nozzle Segment, External, Augmentor - Repair
417 00	Ring, Synchronizing, Augmentor Nozzle - Repair
418 00	Open
419 00	Open
420 00	Connecting Link, Rigid, Augmentor Divergent Nozzle - Repair
421 00	Connecting Link, Augmentor Nozzle Synchronizing Ring - Repair
422 00	Support and Bearing Assembly, Augmentor Nozzle - Repair
423 00	Open
424 00	Support Assembly, Augmentor Nozzle - Repair

WORK PACKAGE

TECHNICAL PROCEDURES

REPAIR -

GENERAL

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	0	4 Blank	0		

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Introduction and General Information	T.O. 2J-F100-53-1
Inspection, Physical, General	WP 071 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains general information applicable to part repair.

2. REPAIR INSTRUCTIONS.

a. Instructions contained in repair work packages supplement judgement and experience that a qualified inspector has gained. The correct interpretation of visual defects of wear, scuffing, pitting, etc., is the result of years of experience in the area of engine parts inspection. As a guide, personnel should carefully follow repair data and rely on good common sense.

WORK PACKAGE

TECHNICAL PROCEDURES

BEARING, AUGMENTOR NOZZLE LEVER -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 5	0	6 Blank	0		

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor nozzle lever bearings.

2. AUGMENTOR NOZZLE LEVER BEARING - BLEND REPAIR.
(See Figure 1.)

a. Blending requirements are as follows:

(1) All local blending shall extend to a distance of at least 15 times depth of damage.

(2) Surface finish of all blends shall be as smooth or smoother than original finish.

b. Blend repair unserviceable nicks and dents on inner and outer races and ball bearing retainer as follows:

(1) Use fine stone.

(2) Remove sharp edges and raised metal as required.

c. After all blending perform fluorescent penetrant inspection per T.O.2J-F100-9. No cracks allowed.

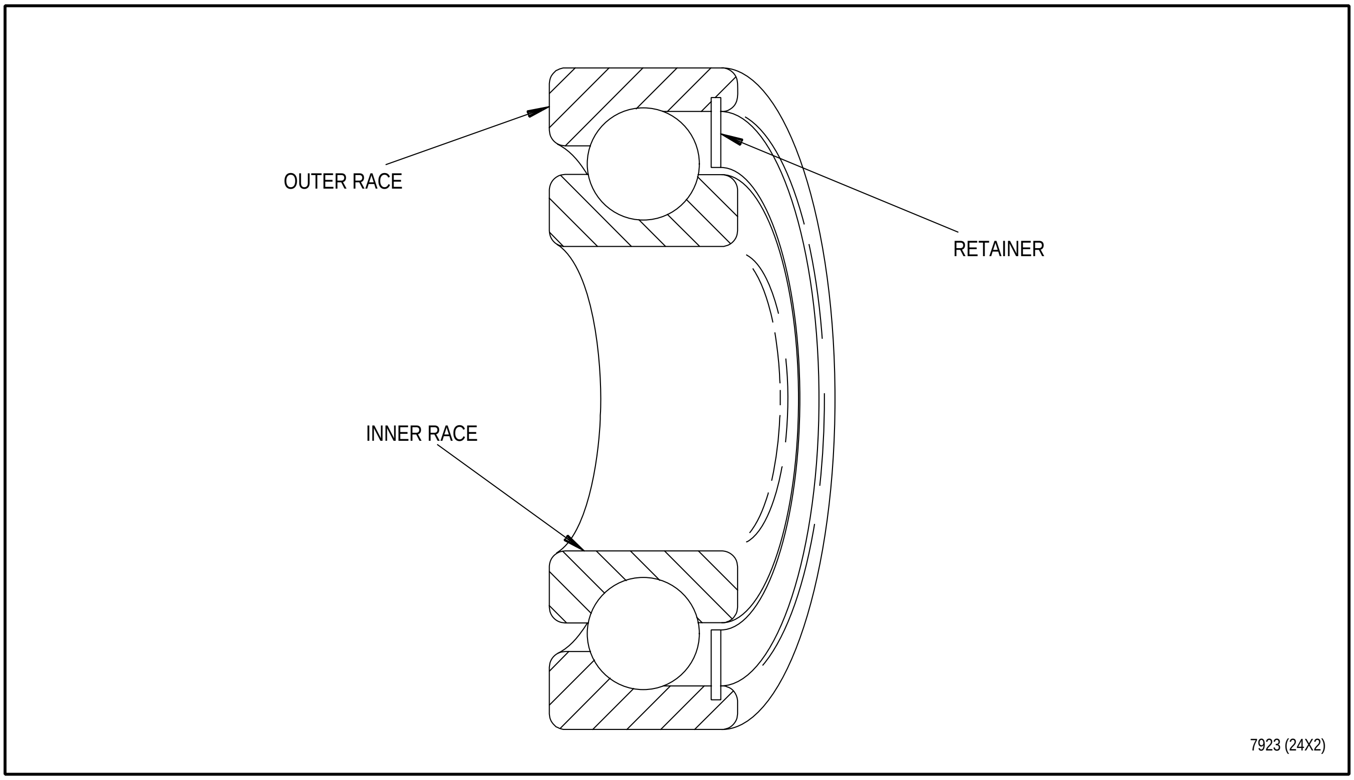


Figure 1. Augmentor Nozzle Lever Ball Bearings - Repair

3. AUGMENTOR NOZZLE LEVER BALL BEARINGS (Typical PN 4001212) - REPAIR. (See figure 1.)

NOTE

Augmentor nozzle lever bearings function as linkage anti-friction pivot bearings only. A slight amount of drag or roughness is acceptable and will not affect augmentor nozzle operation.

WORK PACKAGE

TECHNICAL PROCEDURES

LINER, AUGMENTOR COMBUSTION CHAMBER -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 46

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	21	11 - 14	21	20	18
2	17	15 - 16	17	21	15
3 - 4	6	16A - 16B	21	22	6
5	21	17	21	23	17
6	6	18	6	24 - 25	15
7	15	19	17	26 - 40	18
8 - 10	6			41 - 44 Added	18

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Liner, Augmentor Combustion Chamber - Inspection	WP 303 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, ANTIGALLING (PWA 36035)	FEL-PRO C-300
CROCUS CLOTH OR EQUIVALENT	180 TO 360 GRIT
GLOVES	-
GRIT, SILICON CARBIDE OR ALUMINUM OXIDE	NO. 120
PENCIL (CRAYON), SILVER, METAL MARKING (HARD)	COLOR-TEX NO. 1843 GENERAL PENCIL CO.
SOLVENT, PETROLEUM	P-D-680, TYPE II OR TYPE III
TAPE	PMC 4235
TAPE	PMC 4273
WIRE, WELDING	AMS 5801

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
RIVET	AN123336	AR

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor combustion chamber liner.

2. AUGMENTOR COMBUSTION CHAMBER LINER - WELD REPAIR.

(See Figure 1.)

NOTE

Welding of cracks under 1.00 inch long during repair of longer cracks is optional, but recommended. Cracks over 1.00 inch are reparable per the guidelines in WPs 303 00 and 403 00.

a. Stop drill ends of cracks using a No. 40, 0.098 inch cobalt drill. Remove burrs.

b. If crack has widened due to thermal distortion, recontour using a non-metallic hammer. Be careful not to flatten liner corrugations.

c. If crack has widened due to burning, it is recommended that crack be ground out with a 0.030 to 0.060 inch wide abrasive cut-off wheel.

d. Polish surface to bare metal next to crack on both inner and outer surfaces, especially in thermal barrier and antigalling compound coated areas. Polished area should be minimum 0.100 inch wide around crack.

e. Identify parent material to be welded per figure 1.

f. Select weld wire per T.O. 2-1-111.

g. Tungsten inert gas fusion (GTAW) weld crack. (See T.O. 2-1-111.) Stress relief not required.

h. If weld bead height is greater than 0.010 inch, grind bead down so that maximum height does not exceed 0.010 inch.

i. As required, drill out cooling holes to remove excessive weld material. Permissible to replace plugged slotted holes with round holes.

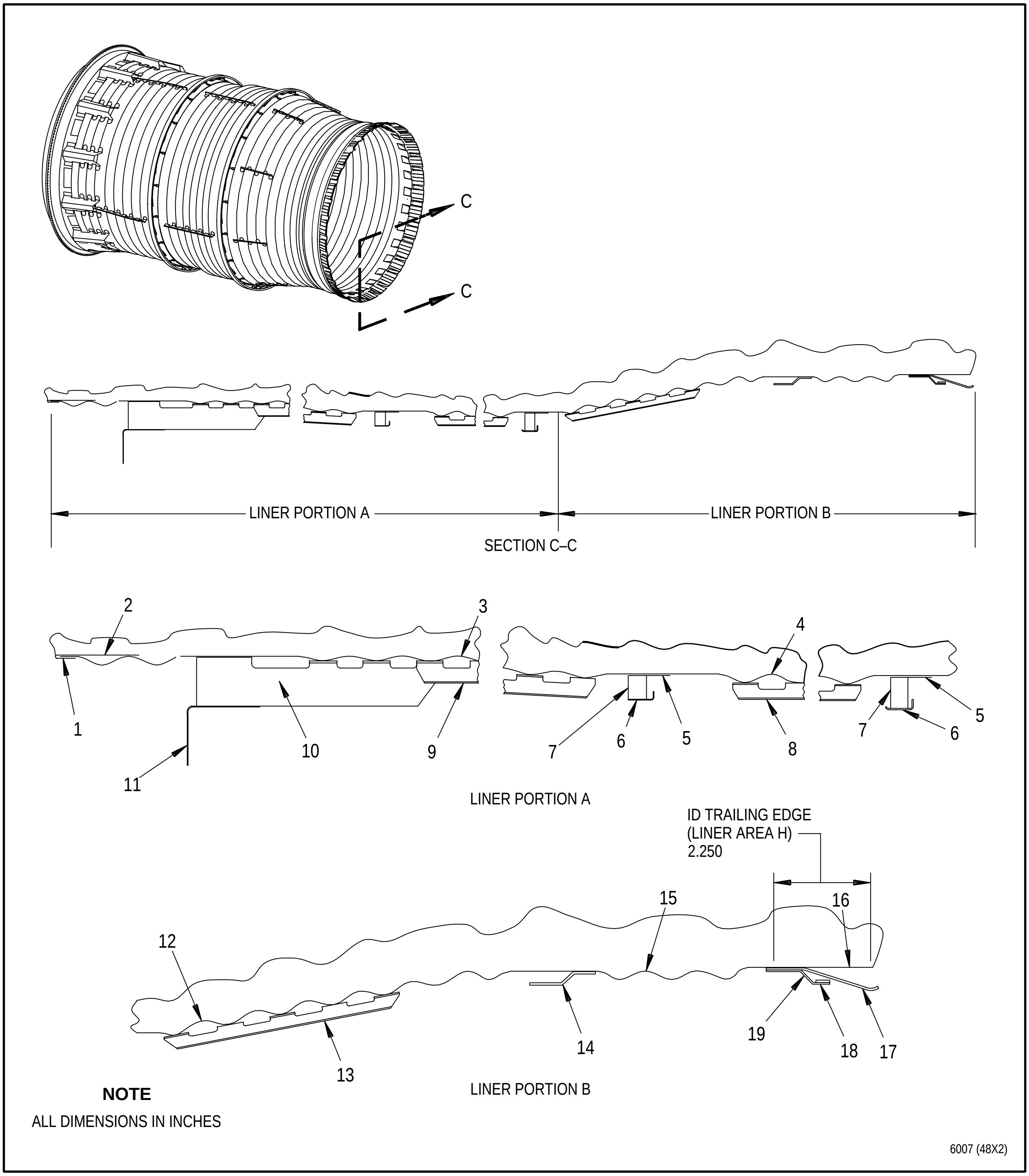


Figure 1. Augmentor Combustion Chamber Liner - Weld Repair

Legend for figure 1

1. Band, AMS 5599, nickel alloy
2. Liner, PWA 1042, cobalt alloy
3. Liner, PWA 1042, cobalt alloy
4. Liner, PWA 1042, cobalt alloy
5. Band, AMS 5596, nickel alloy
6. Band, AMS 5596, nickel alloy
7. Brace, AMS 5596, nickel alloy
8. Stiffener, PWA 1042, cobalt alloy
9. Stiffener, PWA 1042, cobalt alloy
10. Bracket, AMS 5599, nickel alloy
11. Flange, AMS 5596, nickel alloy
12. Liner, PWA 1042, cobalt alloy
13. Stiffener, PWA 1042, cobalt alloy
14. Louver, AMS 5596, nickel alloy
15. Liner, PWA 1042, cobalt alloy
16. Liner, PWA 1042, cobalt alloy
17. Seal assembly, AMS 5596, nickel alloy
18. Band, AMS 5544, nickel alloy
19. Louver, AMS 5544, nickel alloy

3. AUGMENTOR COMBUSTION CHAMBER LINER, AFT END (AREA H) - OUT-OF-ROUNDNESS REPAIR.

(See figure 1.)

NOTE

Liner will bend easier with duct seal rivets removed. This repair should be accomplished concurrently with any duct seal replacement.

a. Locate angular position of largest ID of liner. Mark location.

b. Position liner onto side.

c. Rotate liner to position where marked diameter is perpendicular to floor.

d. Support aft end of liner on blocks so that only forward end contacts floor.

e. Using hand and upper body, lightly apply force radially inward from aft end of liner, in line with marked ID, for less than a second.

(1) Check aft end out-of-roundness limits after each application of force.

(2) Increase, in increments, amount of force until serviceable limits are met.

f. Check minimum and maximum aft end out-of-roundness limits. If dimensions are within maximum limits, but not within minimum limits, rework dimensions for acceptable minimum limits as follows:

(1) Locate angular position(s) of diameters under minimum limit(s). Mark location.

(2) Position liner onto side.

(3) Rotate liner to position where marked diameter is perpendicular to floor.

(4) Support aft end of liner on blocks, and sand or shot bags, so that only forward end contacts floor.

CAUTION

Thermal barrier can be damaged by hammering. When cold working liner with hammer, rawhide or other suitable material should be overlaid at point of impact.

(5) Using rawhide mallet or 12 ounce metal hammer and bucking bar, straighten out-of-roundness diameters of aft end of liner by cold working all areas distorted radially inward to serviceable limits.

4. AUGMENTOR COMBUSTION CHAMBER LINER - PATCH REPAIR.
(See figure 1, and Figures 2, 3, and 4.)

a. Remove damaged area of liner. Do not cut along rows of cooling holes. Most common circumferential cut location is along ridges (peaks) of corrugations, as viewed from outside of liner. Patch should be rectangular. (See figure 2.)

NOTE

PWA 53-33 or PWA 265 thermal barrier coating may be applied to patch before or after welding.

b. Position damaged portion of liner flat on patch material.

(1) Remove all or part of any burned through or damaged material to obtain surface contact.

(2) Align corrugations and cooling holes between damaged material and patch. Ensure that cooling holes are on forward side of ridge corrugation when viewed from outside liner. (See figure 3.)

c. Overcut serviceable patch from patch material.

d. Select weld wire. Refer to figure 2 and T.O. 2-1-111.

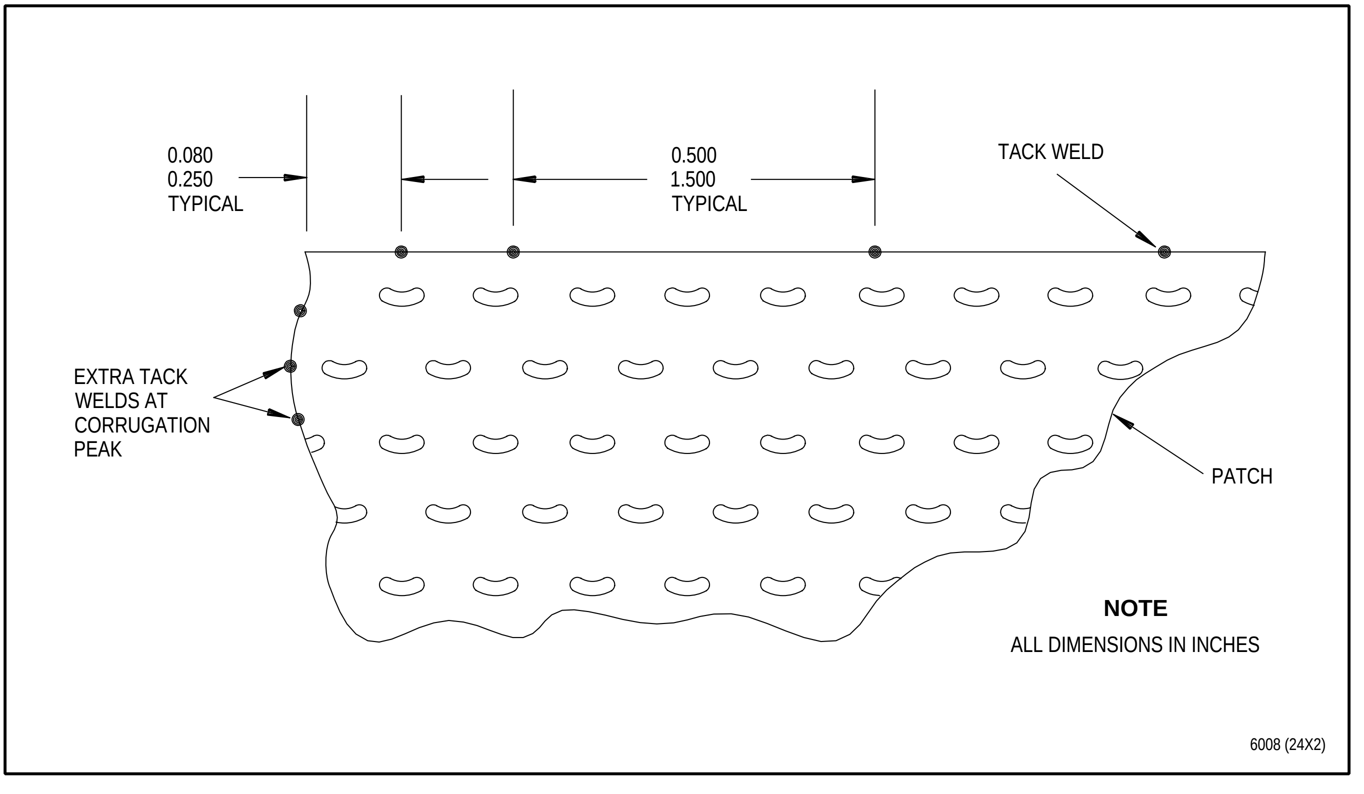


Figure 2. Determining Repair Patch Material and Positioning Repair Patch Correctly

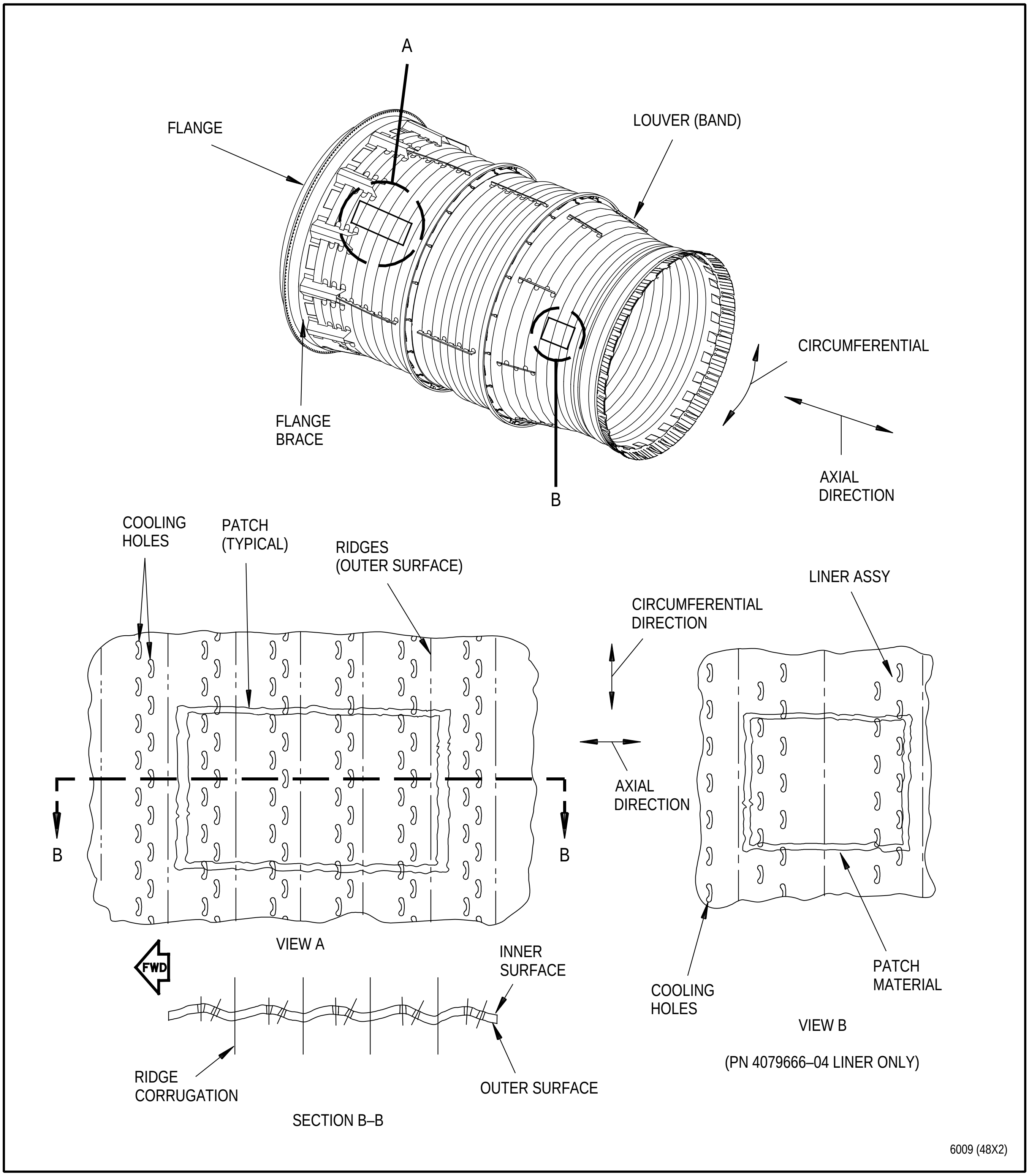


Figure 3. Augmentor Combustion Chamber Liner - Patch Repair

e. Trim patch to fit repair area in liner and meet following requirements.

NOTE

- Best welding results from gap of 0.030 inch or less around edges of patch. Patch may require flattening.
- Cooling hole tolerances are not applicable to holes plugged by seam welds. Holes are redrilled in step m.

(1) Cooling holes and other features (louvers, bands, etc.) of patch and liner shall be circumferentially aligned within 0.100 inch.

(2) Cooling holes in all locations shall be circumferentially and axially aligned within 0.100 inch.

NOTE

Cooling holes in patch shall not be located forward of holes in liner.

(3) Cooling holes in forward half of patch located within forward section of liner shall be axially aligned within 0.250 inch aft of cooling holes in liner.

f. Remove thermal barrier coating and antigalling compound to form border 0.200 inch wide around edge of patch and matching repair area of liner. Remove coating down to base metal.

g. Polish to bare metal both inner and outer surfaces adjacent to weld seam.

CAUTION

- Before tack welding, compare cooling hole orientation on patch with matching liner area. If cooling hole pattern is reversed, thermal damage will result when engine is operated in augmentation.
- Cooling holes on patch shall not be on aft side of ridge corrugation when viewed from outside liner. (See figure 3.)

h. Align patch corrugations. Ensure that cooling holes are on forward side of ridge corrugation when viewed from outside of liner. (See figure 3.)

NOTE

For tack welding and final welding, supply purge gas from inside of liner using a purge block. Weld from outside of liner.

i. Tack weld patch in position. Place tacks within 0.080 to 0.250 inch of corners and space along edges at intervals of 0.500 to 1.500 inches. Include two or more tacks at corrugation ridges (peaks). (See figure 4.)

j. Complete weld of patch to liner. Tungsten inert gas fusion (GTAW) weld. Refer to T.O. 2-1-111. Stress-relief not required.

k. If weld bead height is greater than 0.010 inch above adjacent parent metal, grind bead down so that maximum height does not exceed 0.010 inch.

l. Local fluorescent penetrant inspect welds for cracks. No cracks permitted. Grind out and reweld cracked areas. Refer to T.O. 2-1-111.

m. If cooling holes were filled in by weld bead, drill filled holes as follows:

(1) Do not drill hole through weld bead.

(2) If cooling hole can be relocated within circumferential and axial tolerances outlined, drill one replacement cooling hole of comparable size at this location. This one hole may contact weld bead at only one point.

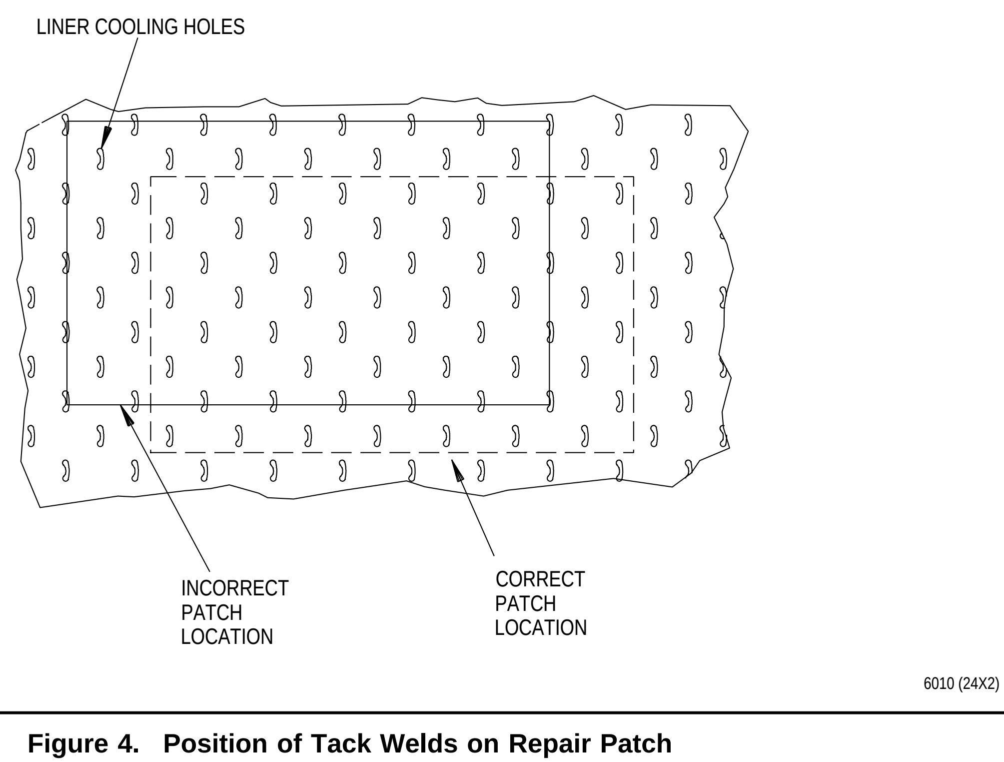


Figure 4. Position of Tack Welds on Repair Patch

(3) If drilling cannot be done within limits specified above, drill two replacement cooling holes of comparable size, one on each side of weld bead. Maintain a 0.040 inch minimum edge distance between cooling holes and weld bead.

(4) Delete filled in cooling holes if they cannot be drilled within the above guidelines.

(5) Local fluorescent penetrant inspect. Refer to T.O. 2-1-111. No cracks are allowed.

n. Inspect for thermal barrier coating in rework area. Patch area shall be coated, if required per paragraph 15, except in weld area. If coverage is unacceptable, liner may be locally stripped/recoated per paragraph 15.

5. AUGMENTOR COMBUSTION CHAMBER LINER - CRACKED STIFFENER REPAIR.
(See figure 1.)

a. Identify parent material to be welded per figure 1.

b. Stop drill partially cracked stiffeners using a 0.060 to 0.110 inch drill. Stiffeners which are cracked completely through do not require drilling.

c. Polish surface next to crack on both sides to remove any thermal barrier coating overspray and/or anti-gallant. Polished area shall be a minimum of 0.100 inch around crack.

d. Weld cracks using GTAW method and welding wire per T.O. 2-1-111.

6. AUGMENTOR COMBUSTION CHAMBER LINER ASSEMBLY - AXIAL STIFFENER OR AXIAL STIFFENER RIVET REPLACEMENT.
(See Figure 5.)

a. Remove rivets attaching stiffener(5, 10, 11, 12) to liner assembly by grinding through rivet heads on inside diameter of liner and punching out rivets.

b. Inspect rivet holes for elongation. Repair elongated rivet holes as follows:

(1) Polish inner and outer surfaces adjacent to rivet holes to bare metal 0.100 inch, minimum from hole edges. Pay special attention to magnesium zirconate and antigalling compound coated areas.

(2) Identify parent material to be welded.

(3) Select welding wire per T.O. 2-1-111.

(4) Tungsten inert gas fusion (GTAW) weld crack per T.O. 2-1-111. Stress relief not required.

(5) Grind weld bead 0.000 to 0.010 inch above adjacent material.

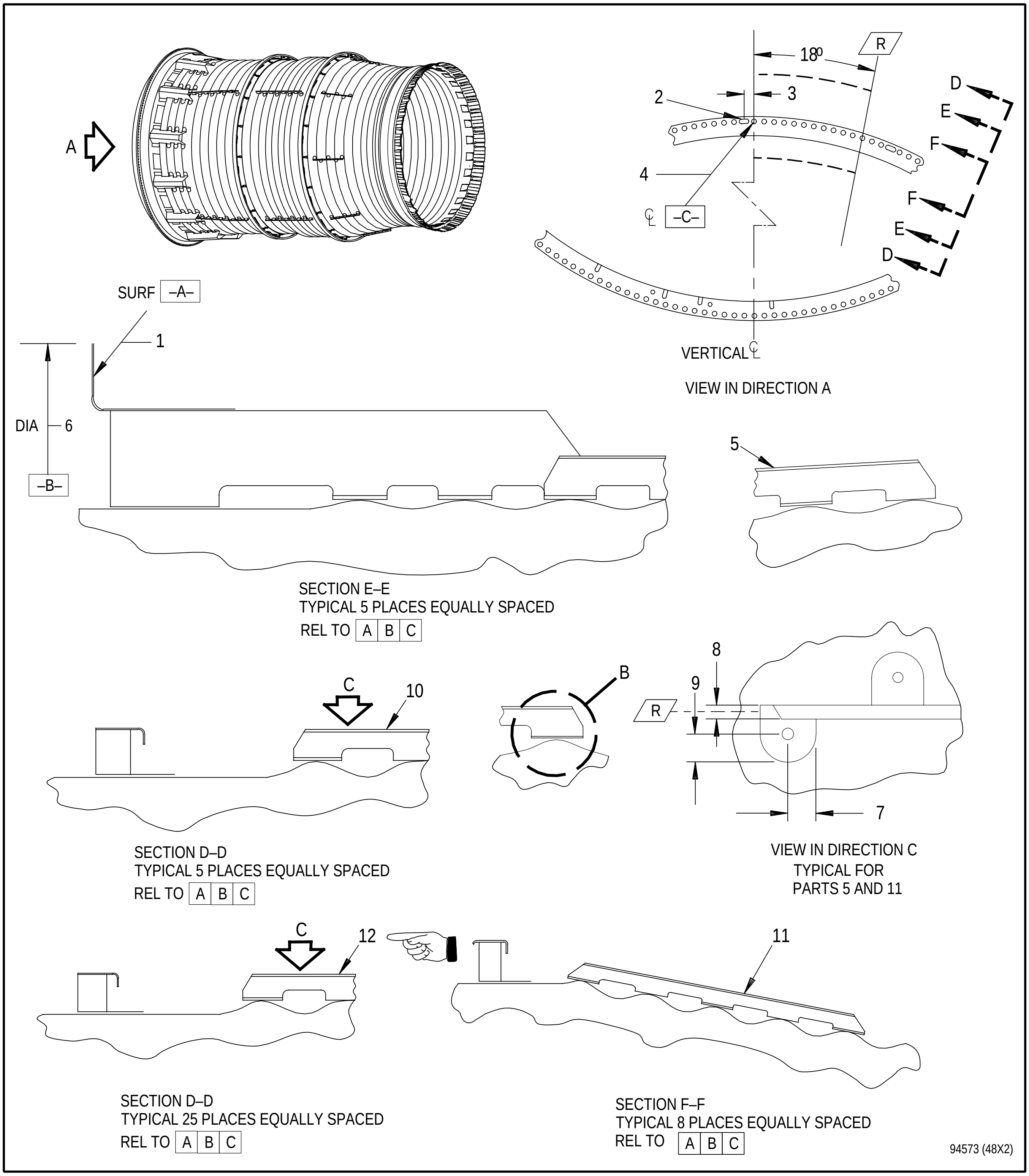
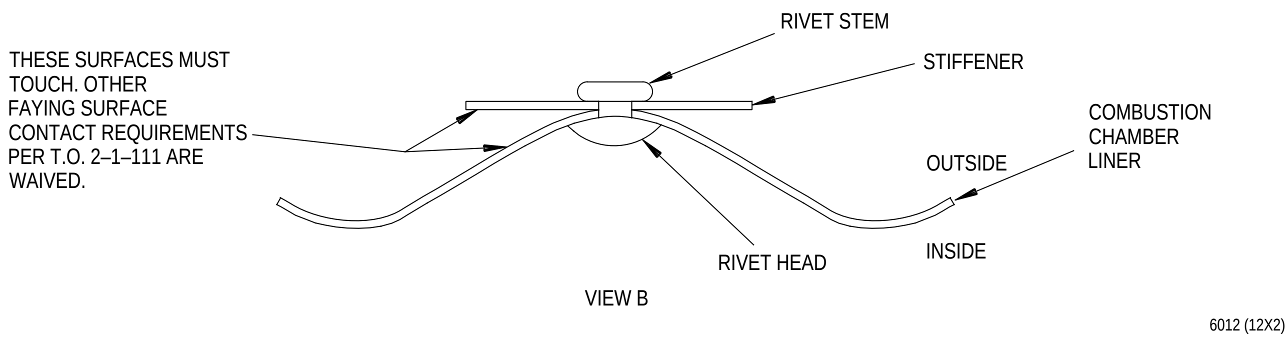


Figure 5. Augmentor Combustion Chamber Liner Assembly Axial Stiffener or Axial Stiffener Rivet Replacement (Sheet 1 of 2)



1. Flange
2. Offset hole
3. 1° 47′ 51″
4. 0.215 inch diameter clearance envelope relative to Surface A and Diameter B.
5. Stiffener, PN 4079600 or 4080834, 5 required.
6. 41.011 inches diameter
7. 0.360 inch
8. 0.250 inch clearance envelope relative to Surface A, Diameter B, and Center Location C.
9. 0.300 inch
10. Stiffener, PN 4078396, 5 required
11. Stiffener, PN 4073697 or 4080836, 8 required.
12. Stiffener, PN 4080835, 25 required

Figure 5. Augmentor Combustion Chamber Liner Assembly - Axial Stiffener or Axial Stiffener Rivet Replacement (Sheet 2 of 2)

c. Align replacement stiffener(5, 10, 11, 12) on liner and transfer drill rivet holes through stiffener from inside diameter using 0.128 to 0.132 inch drill.

CAUTION

To prevent damage to liner skin due to vibration, stiffener and liner assembly outside diameter surfaces must touch. (Other faying surface contact requirements per T.O. 2-1-111 are waived.)

NOTE

Magnesium zirconate coating on rivet heads may be omitted during field repair.

d. Rivet stiffener to liner assembly using PN AN123335 rivets. (See figure 5.)

7. AUGMENTOR COMBUSTION CHAMBER LINER - BAND BRACE (SUPPORT) REPAIR.

(See figure 1 and Figure 6.)

a. Clean and degrease area to be welded. It is not necessary to remove braze material.

b. Identify parent material to be welded per figure 1.

c. Select weld wire per T.O. 2-1-111.

d. Tungsten inert gas fusion (GTAW) weld crack in brace(s). (See T.O. 2-1-111.) Stress-relief not required.

e. Tungsten inert gas fusion (GTAW) weld braze joints that have cracks or separation at forward and aft edges only. (See figure 6.)

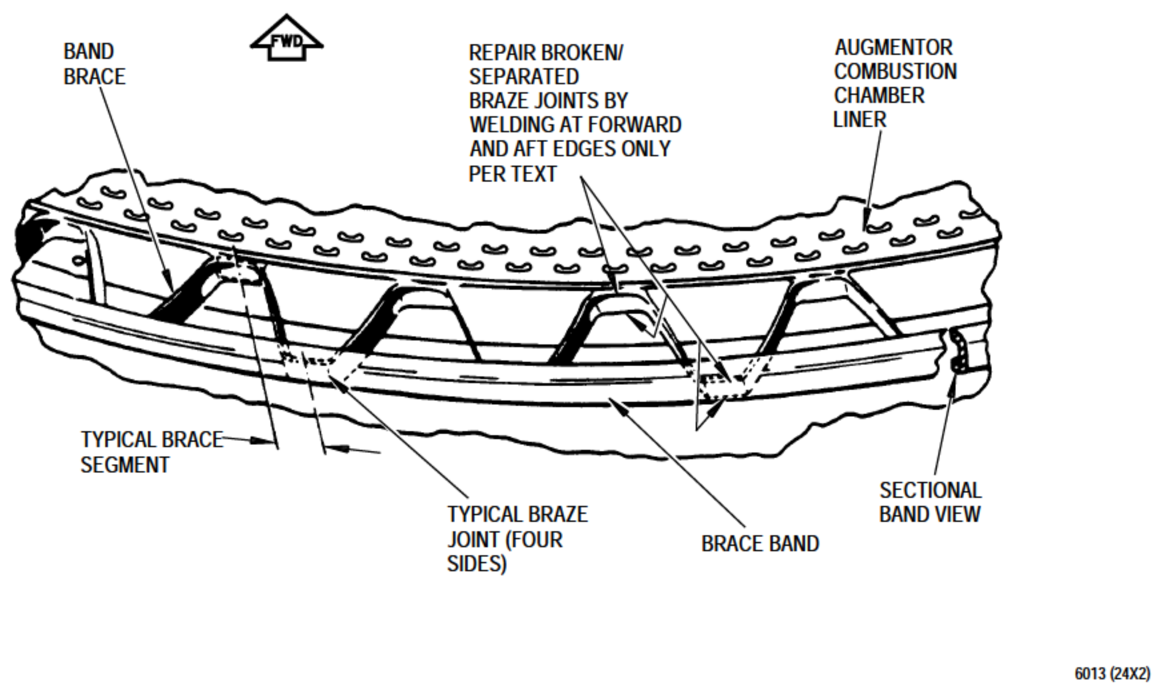


Figure 6. Augmentor Combustion Chamber Liner Band Brace (Support) - Repair

8. AUGMENTOR COMBUSTION CHAMBER LINER - LOUVER (FINGER RETAINING RING) REPLACEMENT.
(See Figure 7.)

NOTE

There are two replacement methods: Method I - louver with predrilled holes (PN 4071334) and Method II - louver without predrilled holes (PN 4074715). Method I requires louver with predrilled holes to align with seal and liner holes. If holes in louver, seal and liner do not align, Method II must be used.

a. Mark each seal (15 locations) using metal marking crayon. Number liner assembly and seals so that locations can be matched during re-assembly. Refer to T.O. 2-1-111.

NOTE

Any parts to be reused must be used in same location and liner from which they were removed.

b. Grind off rivet upset heads and drift out remaining rivets that attach louver and seals to liner assembly.

c. Remove seals and louver by sliding them off aft end of liner assembly.

d. If replacement louver is predrilled go to step e., if replacement louver is not predrilled go to step f.

e. Method I for louver(2) with predrilled holes(PN 4071334) is as follows:

(1) Slide replacement louver (PN 4071334) with predrilled holes onto aft end of liner. Ensure that larger section of louver is toward aft end of liner assembly.

(2) Reinstall seals removed in steps a through c. Line up cooling and rivet holes in seal and liner assembly.

NOTE

Standard putty knives may be used to guide retaining ring onto seals.

(3) Circumferentially position louver as shown and axially align rivet and cooling holes with existing holes in liner assembly.

(4) Clamp seals and louvers in position with temporary fasteners.

NOTE

Rivet holes must meet alignment and size requirements . Refer to T.O. 2-1-111.

(5) Transfer drill or enlarge existing rivet holes from liner assembly and seals through replacement louver as required. Rivet holes in replacement louver will be undersized, 0.124 to 0.128 inch diameter. Final diameter rivet hole shall be 0.128 to 0.132 inch diameter.

(6) Deburr rivet holes and rivet louver and seals to liner assembly. Refer to T.O. 2-1-111.

f. Method II for louver(12) without predrilled holes (PN 4074715) is as follows:

(1) Slide replacement louver (PN 4074715) with no predrilled holes onto aft end of liner. Ensure that larger section of louver is toward aft end of liner assembly.

(2) Reinstall seals removed in steps a through c. Line up cooling and rivet holes in seal and liner assembly.

NOTE

Standard putty knives may be used to guide retaining ring onto seals.

(3) Position louver as shown.

(4) Clamp seals and louvers in position with temporary fasteners.

NOTE

Rivet holes must meet alignment and size requirements. Refer to T.O. 2-1-111.

(5) Transfer drill existing rivet and cooling holes from liner assembly and seals through louver.

(6) Deburr rivet holes and rivet louver and seals to liner assembly. Refer to T.O. 2-1-111.

9. AUGMENTOR COMBUSTION CHAMBER LINER - SEAL (FINGER) REPLACEMENT.
(See figure 7.)

a. If all 15 seals are being replaced, locate datum hole C (see figure 7), and mark for future use using a silver pencil. Also mark louver and liner for reassembly alignment. Refer to T.O. 2-1-111. If all seals are not being replaced and louver is to remain secured to liner assembly, go to step b.

b. Grind off rivet upset heads and drift out remaining rivets that attach seal(s) to liner assembly.

NOTE

Any parts to be reused must be used in same location and liner from which they were removed.

c. Remove seal(s). If all seals are removed, louver will be loose.

d. If using PN 4083156 seal(s) as replacements go to step e., if using PN 4084030 as replacements go to step f.

e. Replace seals with PN 4083156 seal(3) as follows:

(1) If all seals are being replaced go to step e.(2). If single seals are being replaced go to step e.(5).

(2) Install seals as shown, omit three seals 120° apart.

(3) Position louver per alignment marks, rivet holes and cooling holes as shown.

(4) Install three remaining seals and continue per step h.

(5) Position replacement seal(s) axially to align with louver forward edge within ±0.030 inch and circumferentially to meet gap requirements per figure 7. Go to step g.

f. Replace seals with PN 4084030 seal(8) as follows:

(1) If all seals are being replaced go to step f.(2). If single seals are being replaced go to step f.(4).

(2) Position replacement seal(s) axially to align slots centerline with liner assembly cooling hole centerline as shown and circumferentially to meet gap requirements per figure 7.

(3) Position louver per alignment marks, rivet and cooling holes with liner assembly as shown. Go to step h.

(4) Position replacement seal(s) axially to align slots(9) centerline with louver and liner assembly cooling hole centerline as shown and circumferentially to meet gap requirements per figure 7. Go to step g.

g. If insertion of seal is difficult, remove rivets for four inches on both sides of seal being installed. This applies to single seal replacement only.

h. Clamp louver and seal(s) in position with temporary fasteners.

i. Transfer drill rivet holes and cooling holes into replacement seal, rows 2 and 4 only on seal PN 4084030, rows 1 through 4 on seal PN 4083156 per figure 7. Use cobalt drills and drill press.

j. Deburr rivet holes. Rivet seal and louver to liner assembly using rivet(7). Refer to T.O. 2-1-111.

Legend for figure 7

1. Align forward end of seal(3) and louver(2 or 12) within ±0.030 inch.
2. Louver (finger seal retaining ring), PN 4071334
3. Seal (finger), PN 4083156
4. Combustion chamber liner assembly
5. Four circumferential rows of 0.110 to 0.120 inch diameter holes after riveting
6. Combustion chamber liner trailing edge
7. Rivet, PN AN123336
8. Seal (finger), PN 4084030
9. Cooling hole slots, seal PN 4084030 only.
10. Existing rivet holes
11. Existing 0.110 to 0.120 inch diameter holes
12. Louver (finger seal retaining ring), PN 4074715
13. When using PN 4084030 seal, partially or fully blocked cooling holes are acceptable in rows 1 or 3, provided seal is positioned so at least 3 holes are unobstructed in each long slot and at least 1 hole is unobstructed in each short slot.

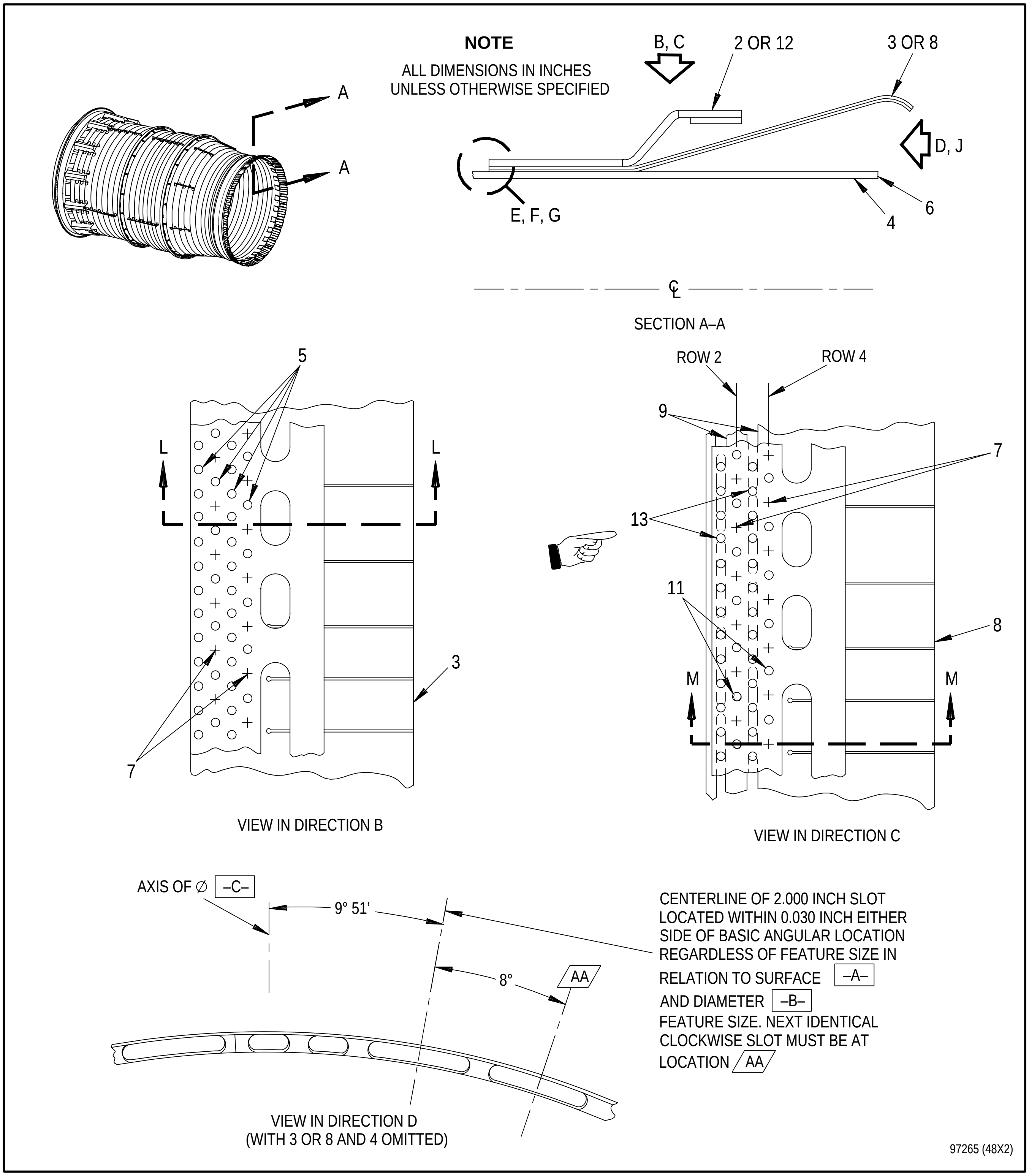


Figure 7. Augmentor Combustion Chamber Liner - Replacement of Seal (Finger) or Louver (Finger Seal Retaining Ring) (Sheet 1 of 2)

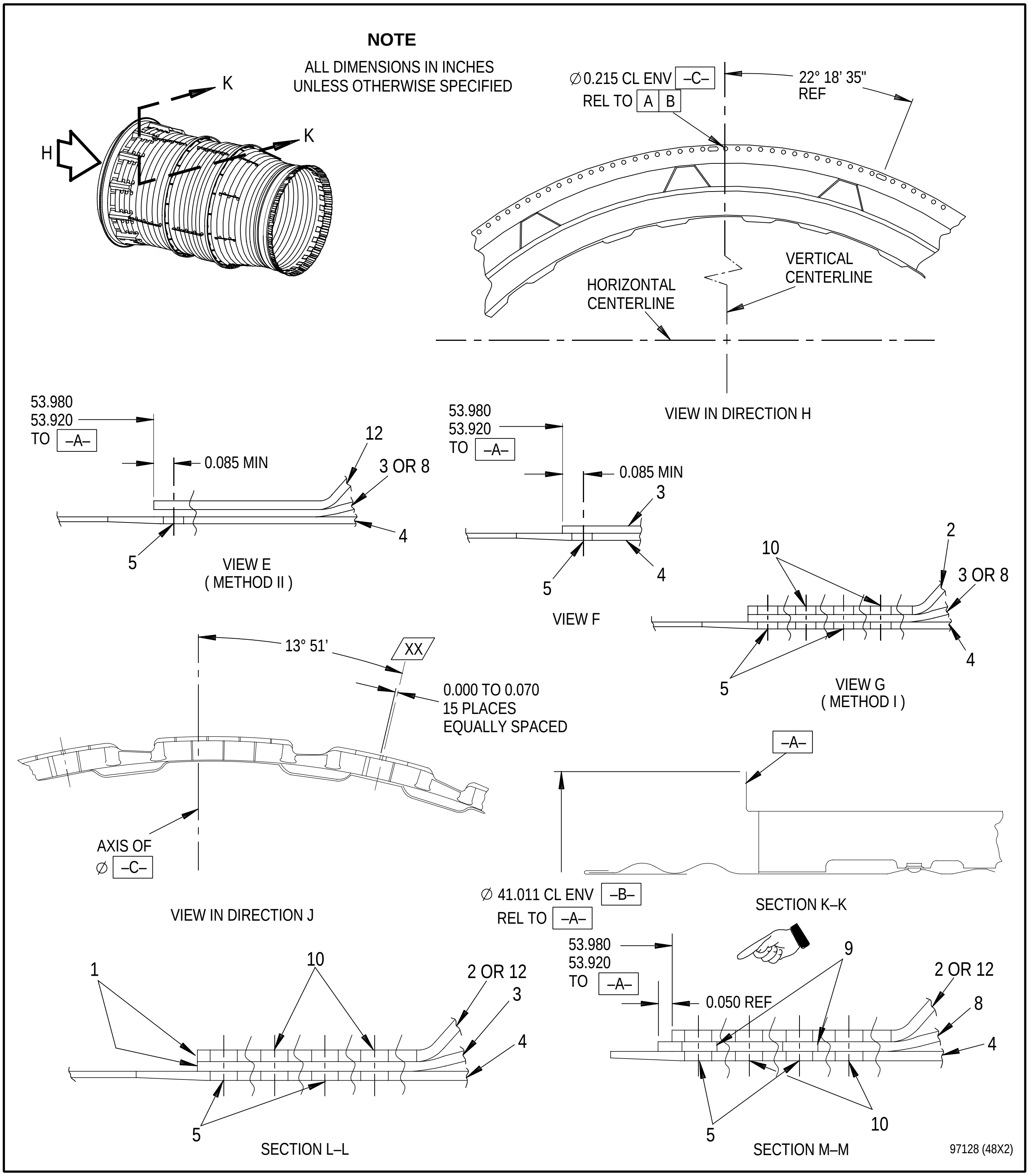


Figure 7. Augmentor Combustion Chamber Liner - Replacement of Seal (Finger) or Louver (Finger Seal Retaining Ring) (Sheet 2 of 2)

10. AUGMENTOR COMBUSTION CHAMBER LINER - REMOVAL OF KNIFE-EDGES FROM SEALS (FINGERS).
(See Figure 8.)

a. Determine length of seal that will remain after knife-edge is removed. (See figure 8.)

b. If seal will be within serviceable limits after removal of knife-edge, repair by grinding off knife-edge with a hand held wheel.

c. If seal will be unserviceable after removal of knife-edge, replace seal per paragraph 9.

11. AUGMENTOR COMBUSTION CHAMBER LINER - REMOVAL OF BURNT EDGES FROM SEALS (FINGERS).
(See figure 8.)

a. Determine length of seal that will remain after burnt material is ground off. (See figure 8.)

b. If seal will be within serviceable limits after removal of burnt material, repair by grinding off burnt material with a hand held wheel. Do not leave a knife-edge on seal trailing edge.

c. If seal will be unserviceable after removal of burnt material, replace seal per paragraph 9.

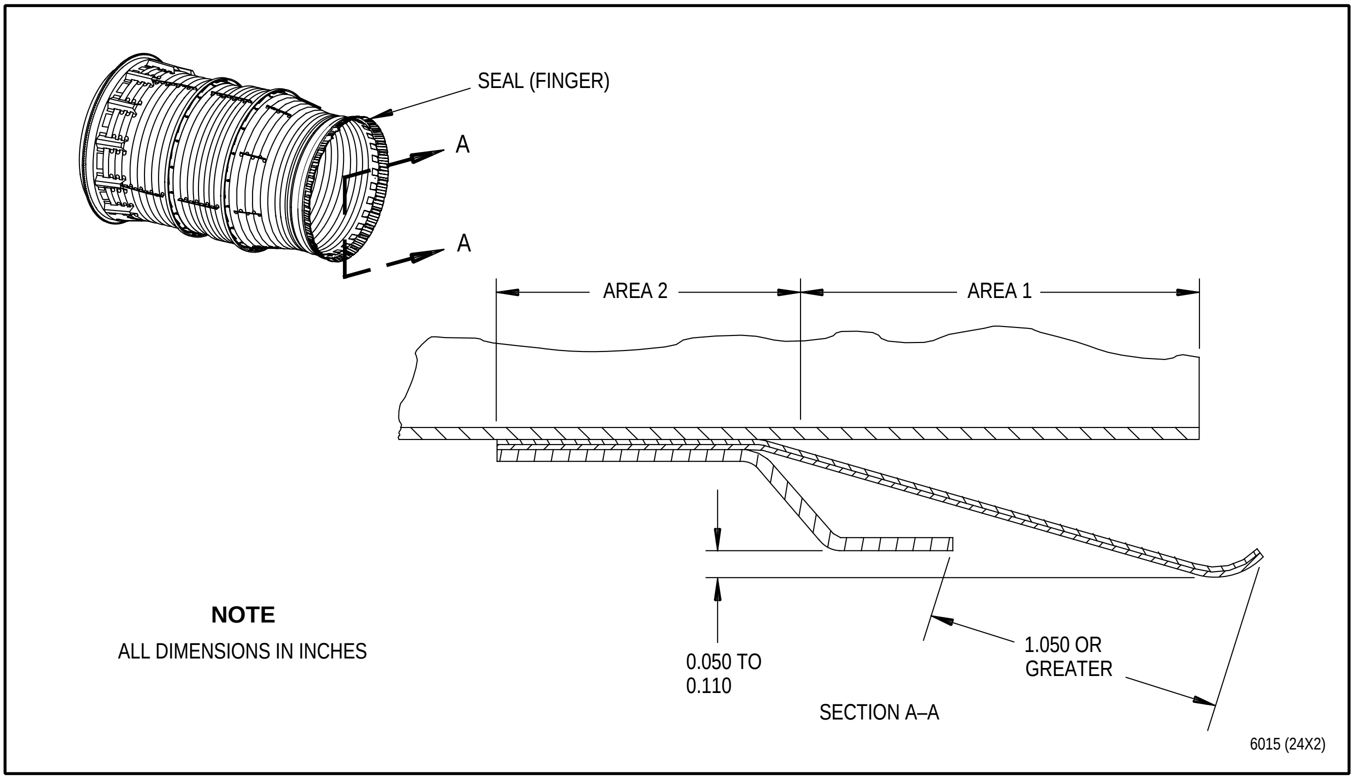


Figure 8. Augmentor Combustion Chamber Liner - Seal Wear and Radial Position Measurements

12. AUGMENTOR COMBUSTION CHAMBER LINER - AFT END PATCH REPAIR.

(See figures 2, 7, and Figure 8.)

NOTE

It is not necessary to stress-relieve following these repairs.

a. If damaged area to be repaired is entirely in Area 1, figure 8, repair as follows:

NOTE

PWA 53-33 or PWA 265 thermal barrier coating may be applied to patch before or after welding. Repair patch material can be determined from figure 2.

(1) Remove locally damaged area of liner.

(2) Using cutout piece as guide, cut serviceable patch from unreparable liner or patch material.

(3) Polish both inner and outer surfaces adjacent to weld joint. Polished area should be a minimum of 0.100 inch around joint.

(4) Tungsten inert gas fusion weld (GTAW) patch to liner using AMS 5801 (Haynes 188) welding wire. (See T.O. 2-1-111.)

(5) Grind weld bead flush to 0.010 inch above parent material.

(6) Inspect for thermal barrier coating in rework area. Patch area shall be coated, if required per paragraph 15, except in weld area. If coverage is unacceptable, liner may be locally stripped/recoated per paragraph 15.

b. If damaged area to be repaired is in or includes an area bounded by Area 2, figure 8, repair as follows:

(1) Remove rivets, as necessary, in damaged area to allow removal of any seals (fingers) in patch zone. Mark location of seals per T.O. 2-1-111 for reinstallation.

(2) Remove damaged area of liner with appropriate cutoff wheel or rotary file. Do not contact louver.

NOTE

PWA 53-33 or PWA 265 thermal barrier coating may be applied to patch before or after welding.

(3) Using removed piece as guide, cut matching serviceable patch from unreparable liner or patch material.

(4) Remove thermal barrier from border 0.200 inch wide around patch and matching liner area. Remove coating down to base metal. Polish inner and outer surfaces before welding.

(5) Position patch in liner with copper stand-off shims in areas where weld lines will pass over louver (to prevent weld from tacking to ring).

(6) Tungsten inert gas fusion weld (GTAW) patch to liner using AMS 5801 (Haynes 188) welding wire. (See T.O. 2-1-111.)

(7) Grind weld bead flush to 0.010 inch above parent material.

(8) Remove copper shims, and reinstall seals in same location from which they were removed. Align forward edge of seal within ±0.030 inch of forward edge of louver. (See figure 7.)

(9) Inspect for thermal barrier coating in rework area. Patch area shall be coated, if required per paragraph 15, except in weld area. If coverage is unacceptable, liner may be locally stripped/recoated per paragraph 15.

13. AUGMENTOR COMBUSTION CHAMBER LINER ASSEMBLY (PN 4079666-01) - SUPPORT BAND BRACE PATCH REPAIR.

(See Figure 9.)

a. Cut out damaged area of liner, removing banded area along with liner skin as shown in figure 9.

NOTE

PWA 53-33 or PWA 265 thermal barrier coating may be applied to patch before or after welding.

b. Use damaged part as a guide. Cut a rectangular patch from an unreparable liner or patch material. Take patch from peak of OD corrugations. Ensure braces are long enough to overlap by at least 1/4 inch.

c. Check fit and trim on patch. Patch may require flattening. Best welding results from gap of 0.030 inch or less around edges of patch.

d. Remove thermal barrier and dry film lubricant from border 0.200 inch wide around patch and matching liner area. Remove coating down to base metal.

e. Polish to bare metal next to weld seam on both inner and outer surfaces, just before welding.

CAUTION

If cooling hole pattern is reversed, thermal damage will result when engine is operated in augmentation.

e1. Position patch correctly by comparing cooling hole orientation on patch with matching liner area. See figure 9.

f. Tack weld patch in position. Place tacks within 0.080 to 0.250 inch of corners and space along edges at intervals of 0.500 to 1.500 inches. See figure 9.

g. Complete weld of patch to liner. Tungsten inert gas fusion (GTAW) weld. (Refer to T.O. 2-1-111.)

h. Local fluorescent penetrant inspect welds for cracks. No cracks are permitted. Grind out and reweld cracked areas.

i. If weld bead height is greater than 0.010 inch, grind it down so that maximum does not exceed 0.010 inch.

j. If any cooling holes were filled in by weld bead, redrill holes using following guidelines:

(1) Do not redrill hole through weld bead.

(2) If cooling hole can be relocated within circumferential and axial tolerances outlined, redrill one replacement cooling hole of comparable size at this location. This hole may contact weld bead at only one point.

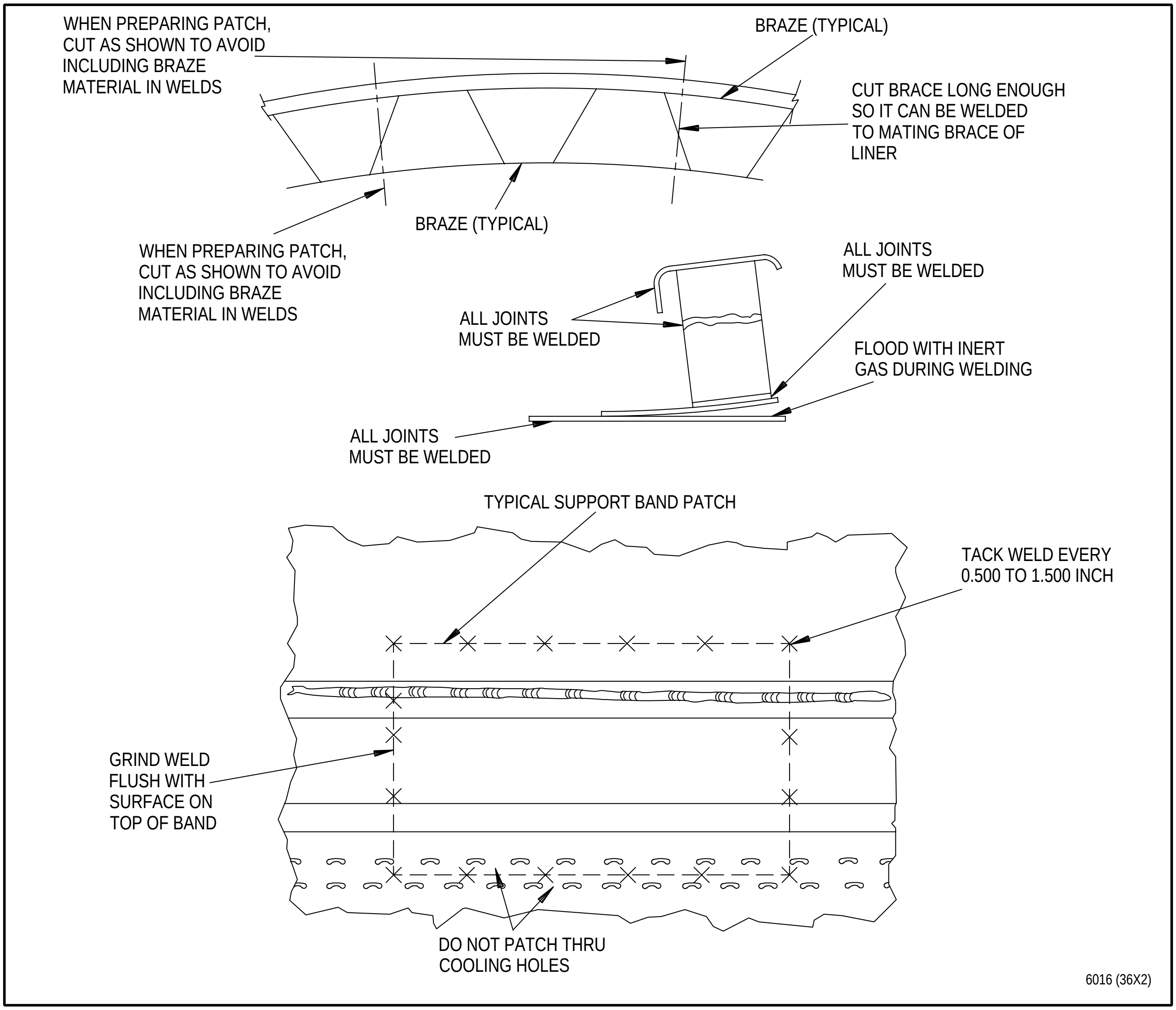


Figure 9. Augmentor Combustion Chamber Liner Assembly - Support Band Brace Patch Repair

(3) If redrilling cannot be done within limits specified above, redrill two replacement cooling holes of comparable size at this location. The replacement holes may contact weld bead. Maintain a 0.040 inch minimum edge distance between cooling holes and weld bead.

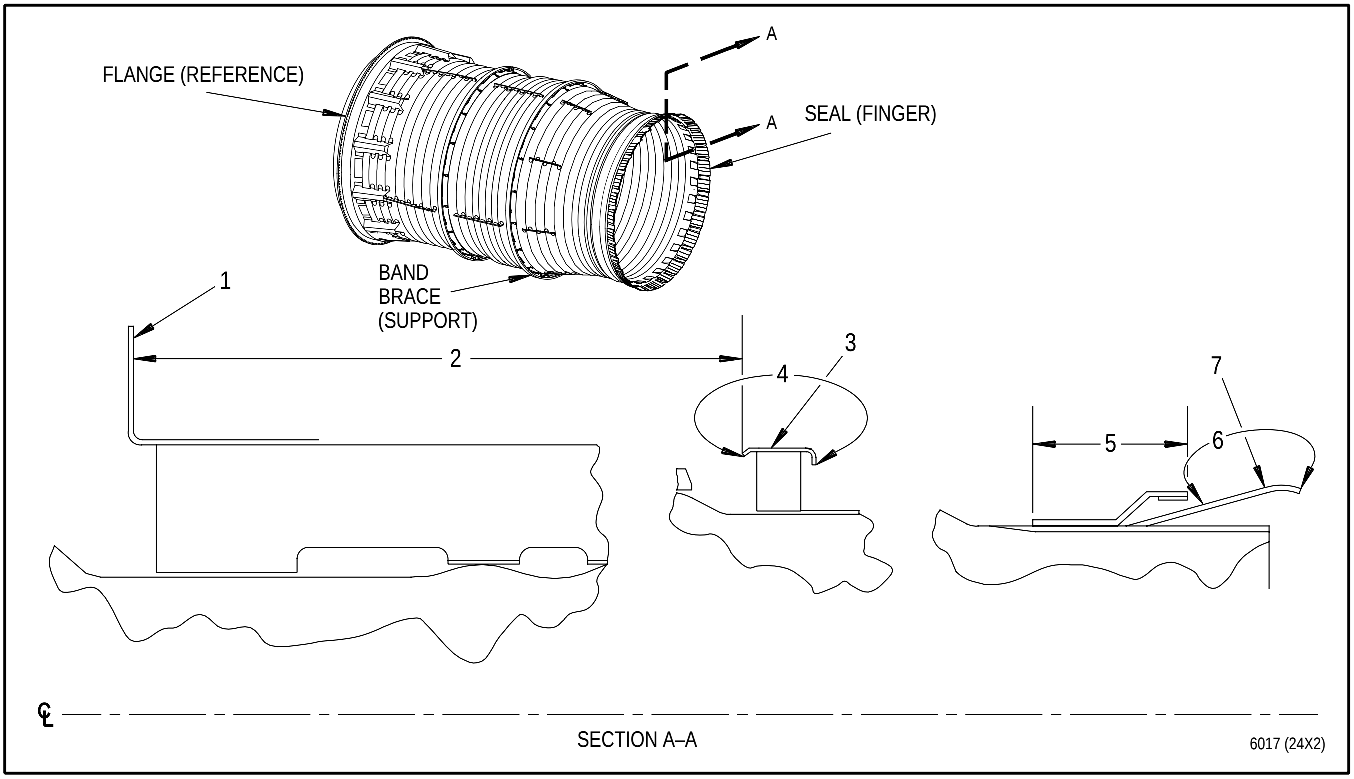
(4) Delete filled in cooling holes if they cannot be redrilled within above guidelines.

k. Inspect thermal barrier coating in rework area. Patch area shall be coated, if required per paragraph 15, except in weld area. If coverage is unacceptable, liner may be locally stripped/recoated per paragraph 15.

14. AUGMENTOR COMBUSTION CHAMBER LINER - ANTIGALLING COMPOUND APPLICATION.
(See Figure 10.)

a. Prepare surface of augmentor combustion chamber seal with P-D-680, Type II or Type III cleaning solvent.

b. Apply PWA 36035 antigalling compound to areas of liner, as shown.



1. Flange reference
2. 34.4 inches reference
3. Band
4. PWA 36035 antigalling compound
5. 2.000 inches reference
6. PWA 36035 antigalling compound
7. Seal

Figure 10. Augmentor Combustion Chamber Liner - Antigalling Compound Application

15. AUGMENTOR COMBUSTION CHAMBER LINER ASSEMBLY - THERMAL BARRIER COATING REPAIR OR REPLACEMENT. (See Figure 11.)

NOTE

It is permissible to locally repair or completely replace subject coating. Complete coating replacement does not require masking.

a. Mark liner as follows:

(1) If coating is being locally removed (patch repaired), mask area adjacent to location being repaired with PMC 4235 and PMC 4273 tape. Refer to T.O. 2-1-111.

CAUTION

To avoid damage to liner, do not allow grit blast to dwell on base metal.

b. Use one of two methods to remove thermal barrier coating. For local or complete removal go to step c. Go to step d. for complete removal.

CAUTION

To avoid surface contamination, use clean gloves to handle cleaned surfaces before coating.

c. Grit blast as required to remove thermal barrier coating. Use No. 120 grit maximum size silicon carbide or aluminum oxide at 45 psig maximum pressure. Keep blast overspray away from serviceable coating areas.

(1) Remove all coating (thermal barrier and undercoat). Refer to T.O. 2-1-111.

d. Remove complete thermal barrier coating by soaking liner in 50/50 nitric acid (SPOP 50) for 2 hours maximum.

(1) Grit blast residual coating as required. Use No. 120 grit silicon carbide or aluminum oxide applied at 30 psig maximum pressure.

(2) Remove all coating (thermal barrier and undercoat) by either grit blast or acid bath. Refer to T.O. 2-1-111.

e. Inspect liner to verify removal of coating.

NOTE

Thickness of liner may be measured using Panametrics No. 5223 ultrasonic thickness gage and No. M208 transducer. from Panametrics, Inc. 221 Cresent Street, Waltham, Massachusetts 02154 or equivalent.

f. Inspect parent metal thickness to ensure grit blast preparation has not reduced thickness below acceptable limits. Minimum liner thickness is 0.020 inches, aft segment minimum is 0.034 inches (see figure 11).

g. Replace local masking as required. Mask for 100% coating replacement with PMC 4235 and PMC 4273 tape (see figure 11). Refer to T.O. 2-1-111.

NOTE

Specimen coupon(s) may be fabricated from unreparable assemblies. No trace of coating, undercoat or bond coat, permitted on coupon(s).

h. Fabricate coating specimen as follows:

(1) For liners requiring total coating replacement, manufacture coupons to approximate liner coutour at locations noted in figure 11. (Five, 1.0 X 2.0 X 0.020 inch, minimum size coupons).

(2) For liners requiring local (patch) coating replacement, manufacture coupon to match contour adjacent to recoat area. (One, 1.0 X 2.0 X 0.020 inch, coupon required per patch repair).

i. Attach coupon(s) to liner using heat resistant tape or temporary fasteners located as follows:

(1) For liners requiring total coating replacement see figure 11. Measure and record coupon thickness.

(2) For liners requiring local (patch) coating replacement, locate coupon on masking adjacent to recoat area. Measure and record coupon thickness.

NOTE

Apply coating as soon as possible after cleaning, preferably within 2 hours.

j. Clean area(s) to be recoated per SPOP 208 method A. Refer to T.O. 2-1-111.

NOTE

PWA 265 coating is source controlled, refer to T.O. 2-1-111 for approved source.

k. Apply coating as follows:

(1) Apply first coat (bond coat) to thickness shown in figure 11.

(2) Remove coupon(s), verify bond coat thickness. If coating is too thick, strip and recoat per above steps. If coating is too thin, reattach coupon(s) at prior location, apply more bond coat.

(3) Apply second coat (thermal barrier) to thickness shown in figure 11.

(4) Remove coupon(s), verify total coating thickness. If coating is too thick, strip and recoat per above steps. If coating is too thin apply more thermal barier coat.

Legend for figure 11

1. Undercoat to be 0.002 to 0.005 inch thick. Total thickness to be 0.008 to 0.012 inch.
2. Undercoat to be 0.002 to 0.005 inch thick. Total thickness to be 0.014 to 0.020 inch.
3. Mask enclosed area.
4. Specimen coupon location. Coupon to coupon location relationship is not important.

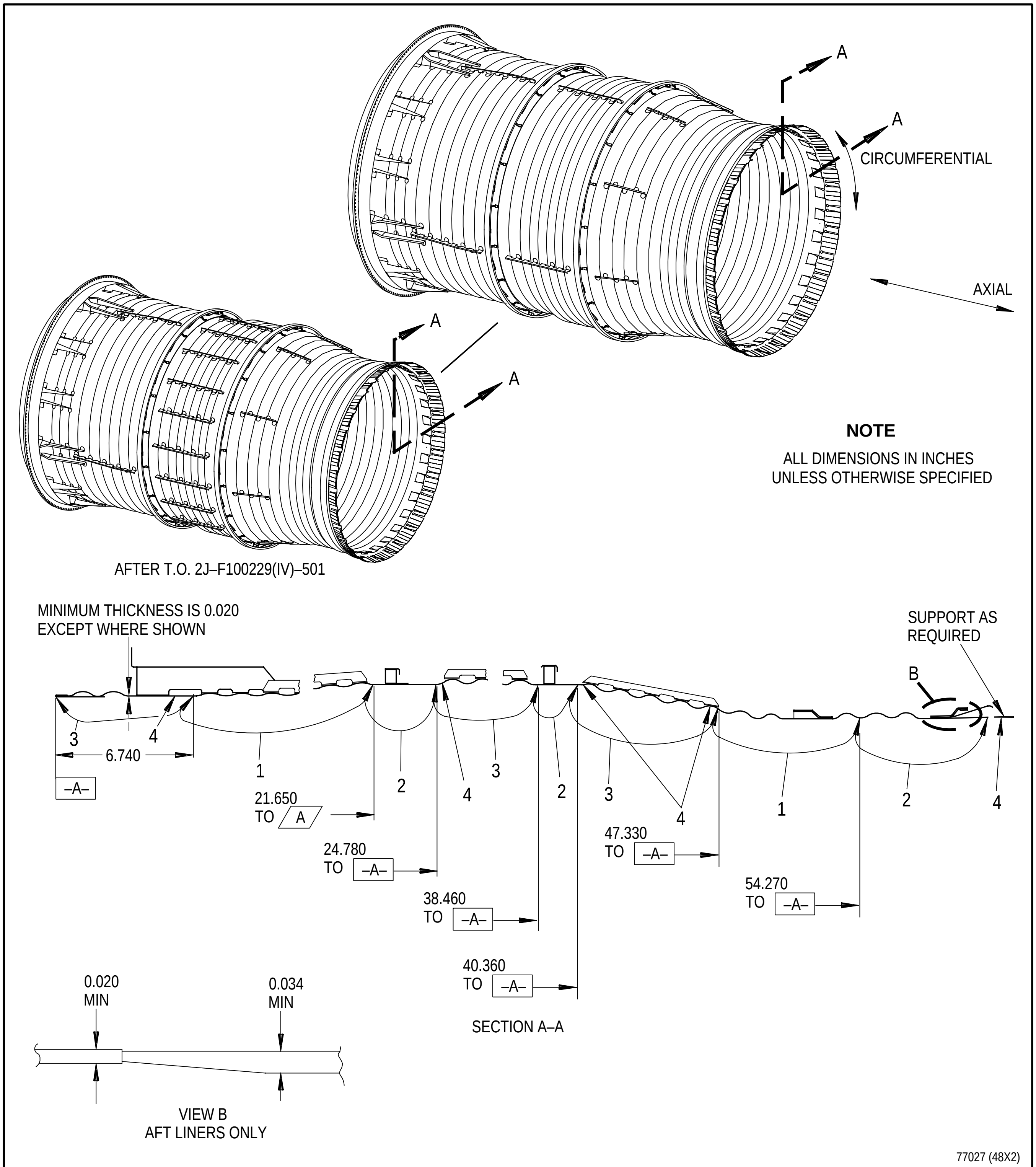


Figure 11. Augmentor Combustion Chamber Liner Assembly - Thermal Barrier Coating Repair or Replacement.

l. Remove masking.

m. Wipe part using cloth moistened with isopropyl alcohol (PMC 9094) to remove tape residue.

n. Inspect coating for correct application. See figure 11.

o. Mark liner with coating source symbol in flange area adjacent to existing part number. Use shallow electrolytic etch. Refer to T.O. 2-1-111.

16. AUGMENTOR COMBUSTION CHAMBER LINER ASSEMBLY - LINER SUBASSEMBLY REPLACEMENT
(See Figure 12.)

a. Completely remove thermal barrier coating per paragraph 15.

NOTE

Liner segment(2), seal assembly(3), and louver assembly(4) are reuseable as a subassembly(5).

b. Locate datums -A- , -B- , and -C- in figure 12 and View A and temporarily mark for future use. Refer to T.O. 2-1-111.

c. Locate axial butt weld joint in liner segment(2), and temporarily mark for future use. See figure 12 and View F. Refer to T.O. 2-1-111.

NOTE

Any parts that are to be reused must be used on the liner that they were removed from and in the same location from which they were removed.

d. Temporarily mark liner subassemblies (5) and (6) as a set. Refer to T.O. 2-1-111.

e. Locate centerline of existing butt weld(9), surface KB in figure 12, and temporarily mark for future use. Refer to T.O. 2-1-111.

WARNING

To avoid eye injury or respiratory distress, wear eye protection and use respiratory protection during machining operations.

f. Remove liner subassembly(5) by machining through butt weld at surface KD . See figure 12 and View D.

g. Remove liner subassembly(1) by machining through butt weld at surface KB . See figure 12 and View B.

h. After removal of subassembly(1), measure gap between liner subassemblies (5) and (6). Gap must meet dimension (8) to continue with this repair. Dimension (8) includes 0.040 inch weld shrinkage allowance.

i. Prepare existing liner subassemblies (5) and (6) for welding per figure 12 and Views E and C.

j. Remove all residual coating by polishing both sides, inner and outer, of liner subassembly(6) at surface KB using 180 to 360 grit crocus cloth or equivalent. Polished area should be a minimum of 0.100 inch wide. Liner must conform to dimensions in figure 12 and View E.

k. Clean areas to be welded on both subassemblies, (1) and (6), in figure 12 and View H. Refer to T.O. 2-1-111, SPOP 208, Method A.

l. Position replacement liner subassembly(1) per figure 12 and Views F, H, and L.

NOTE

Parent material is PWA 1042 (Haynes 188).

m. Manual (MA) or Machine (ME) Gas Tungsten Arc Weld (GTAW). Refer to T.O. 2-1-111, PWA 16-7, and figure 12, View H. Use AMS 5801 filler material.

n. Remove all residual coating by polishing both sides, inner and outer, of liner subassembly(5) at surface KD using 180 to 360 grit crocus cloth or equivalent. Polished area should be a minimum of 0.100 inch wide. Liner must conform to dimensions in figure 12 and View C.

o. Clean areas to be welded on both subassemblies, (1) and (5), in figure 12 and View G. Refer to T.O. 2-1-111, SPOP 208, Method A..

p. Position liner subassembly(5) per figure 12 and Views F, G, and J.

NOTE

Dimension marked (7) includes 0.020 inch weld shrinkage allowance before welding.

q. Inspect dimension (7) to verify replacement liner subassembly(5) is positioned correctly. Surface KD may be trimmed to meet dimension (7).

NOTE

Parent material is PWA 1042 (Haynes 188).

r. Manual (MA) or Machine (ME) Gas Tungsten Arc Weld (GTAW). Refer to T.O. 2-1-111, PWA 16-7, and figure 12, View G. Use AMS 5801 filler material.

s. Heat treat liner assembly. Refer to T.O. 2-1-111, SPOP 465. Stepwise heatup can be omitted.

t. Locally fluorescent penetrant inspect welds 1 and 2 in figure 12, Views G and H, for cracks per SPOP 70 to SFPS 38. Refer to T.O. 2-1-111. No cracks permitted. If cracks are present, grind out cracks, weld crack area, heat treat liner, inspect welds per steps 16.k, 16.o, 16.m, and 16.r as applicable, and repeat steps 16.s and 16.t.

u. Inspect rivets for looseness and reset as required. Refer to T.O. 2-1-111, PWA 357.

v. Clean liner assembly inside diameter (area to be coated) per SPOP 208, method B. Refer to T.O. 2-1-111.

w. Coat liner assembly inside diameter with thermal barrier coating per paragraph 15.

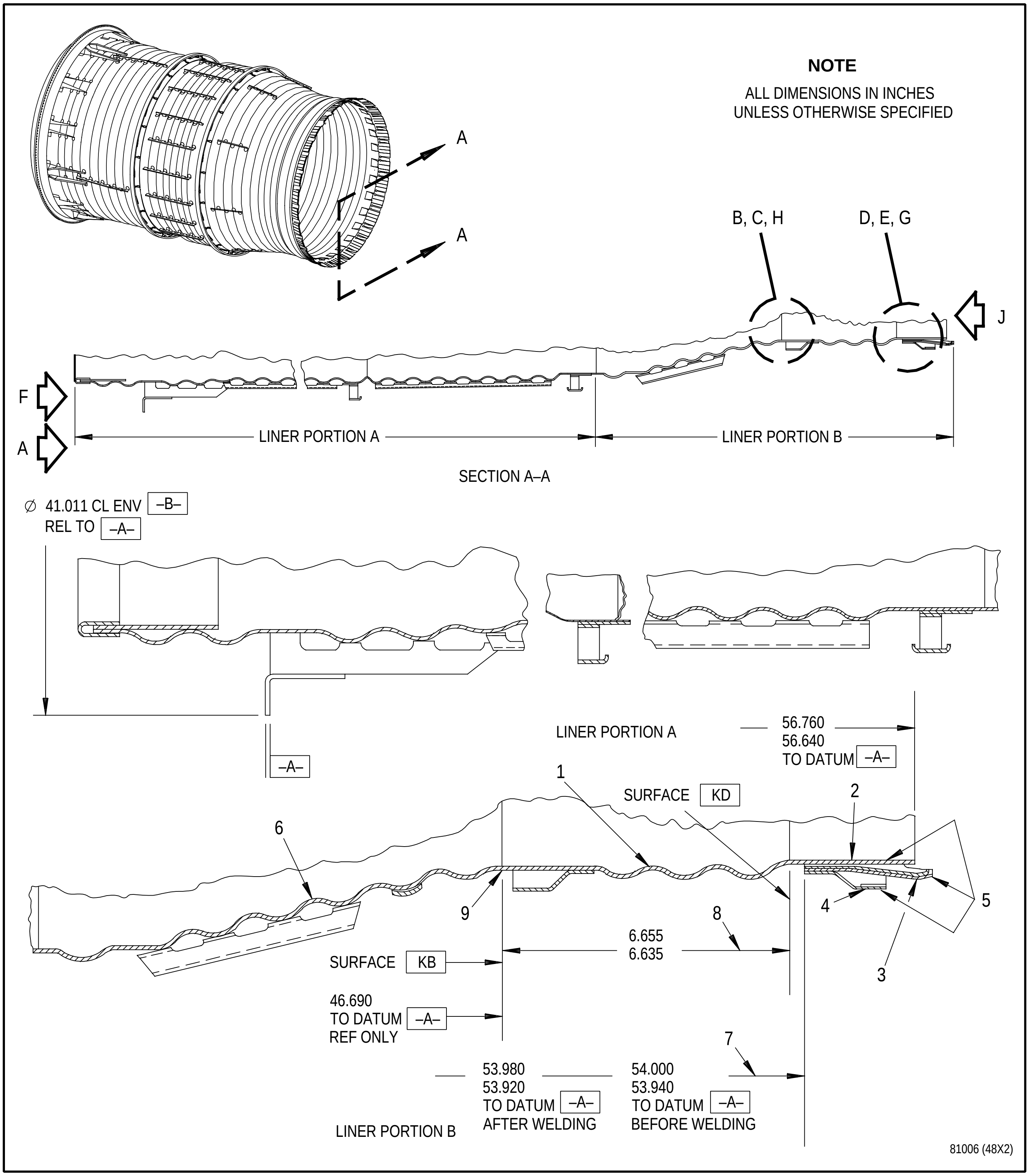


Figure 12. Augmentor Combustion Chamber Liner Assembly (Sheet 1 of 7)

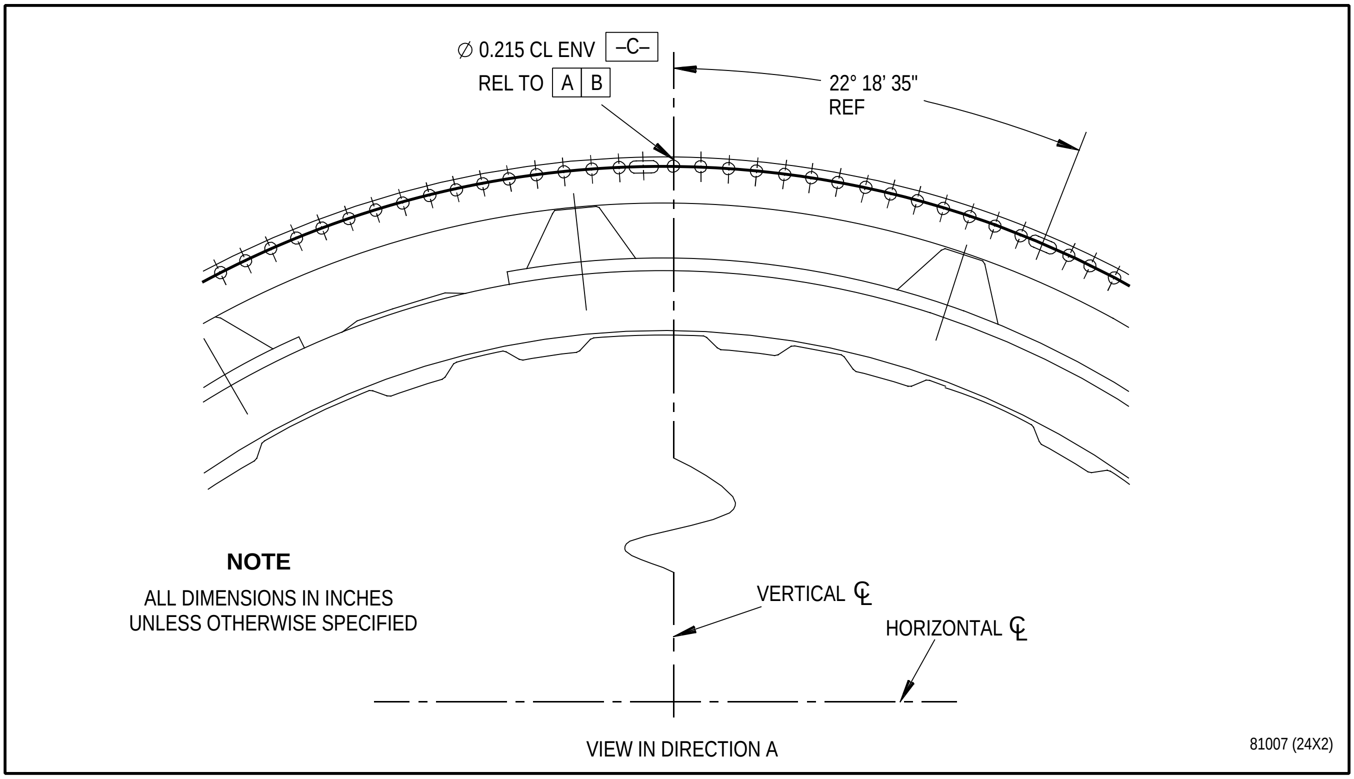


Figure 12. Augmentor Combustion Chamber Liner Assembly (Sheet 2 of 7)

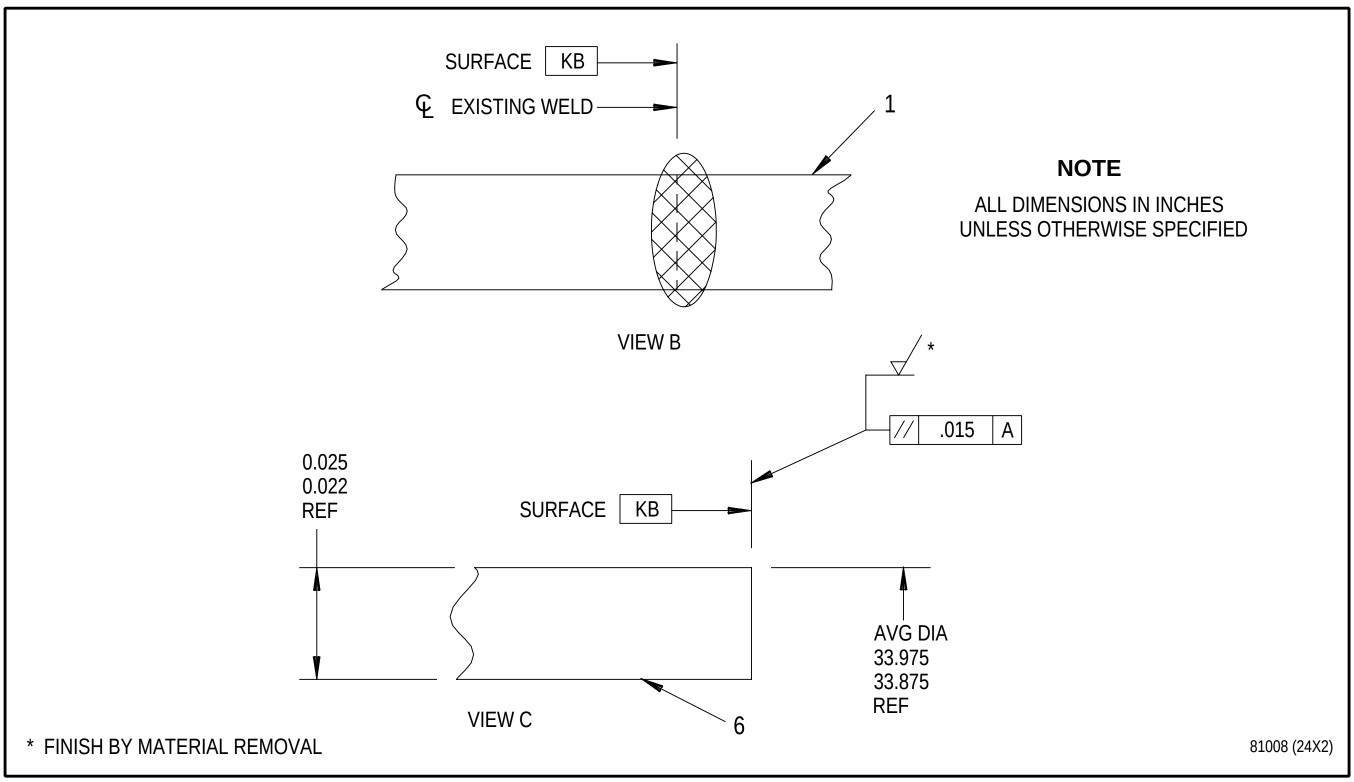


Figure 12. Augmentor Combustion Chamber Liner Assembly (Sheet 3 of 7)

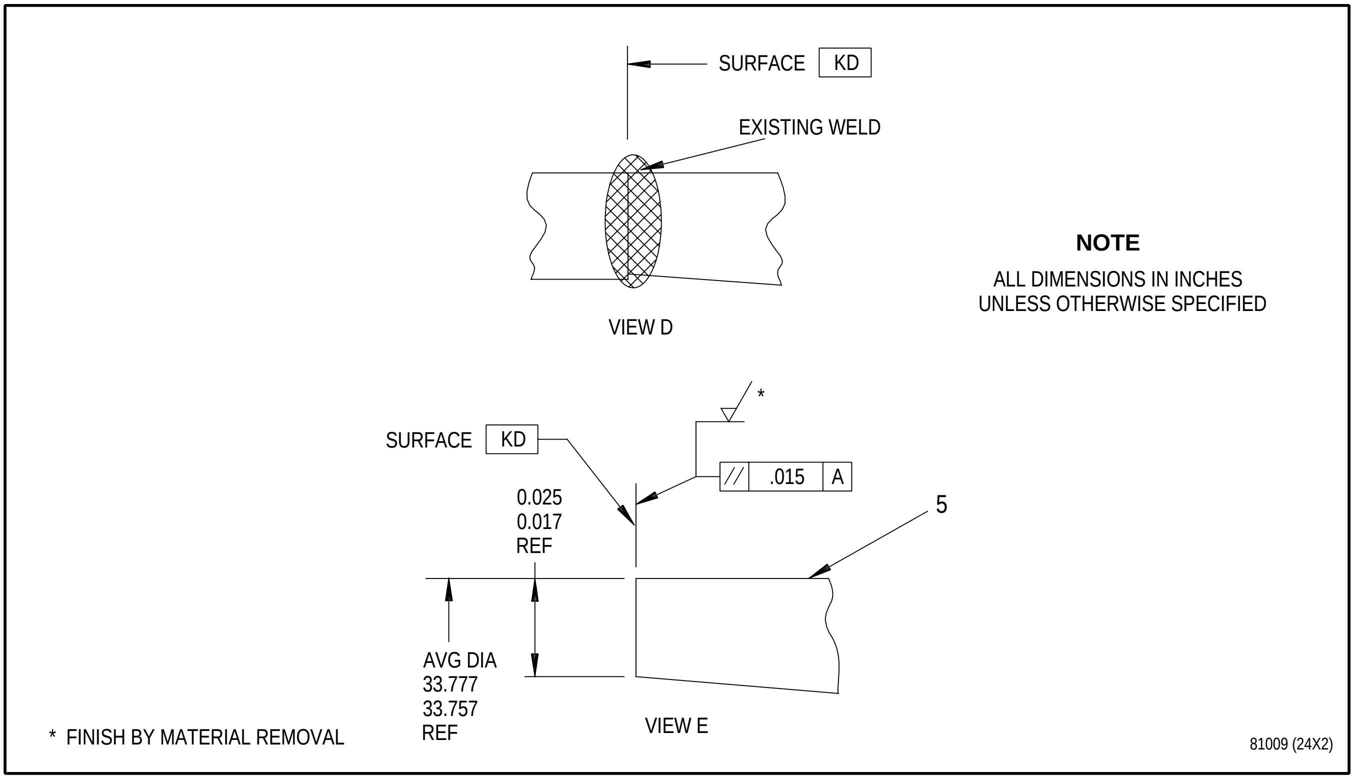


Figure 12. Augmentor Combustion Chamber Liner Assembly (Sheet 4 of 7)

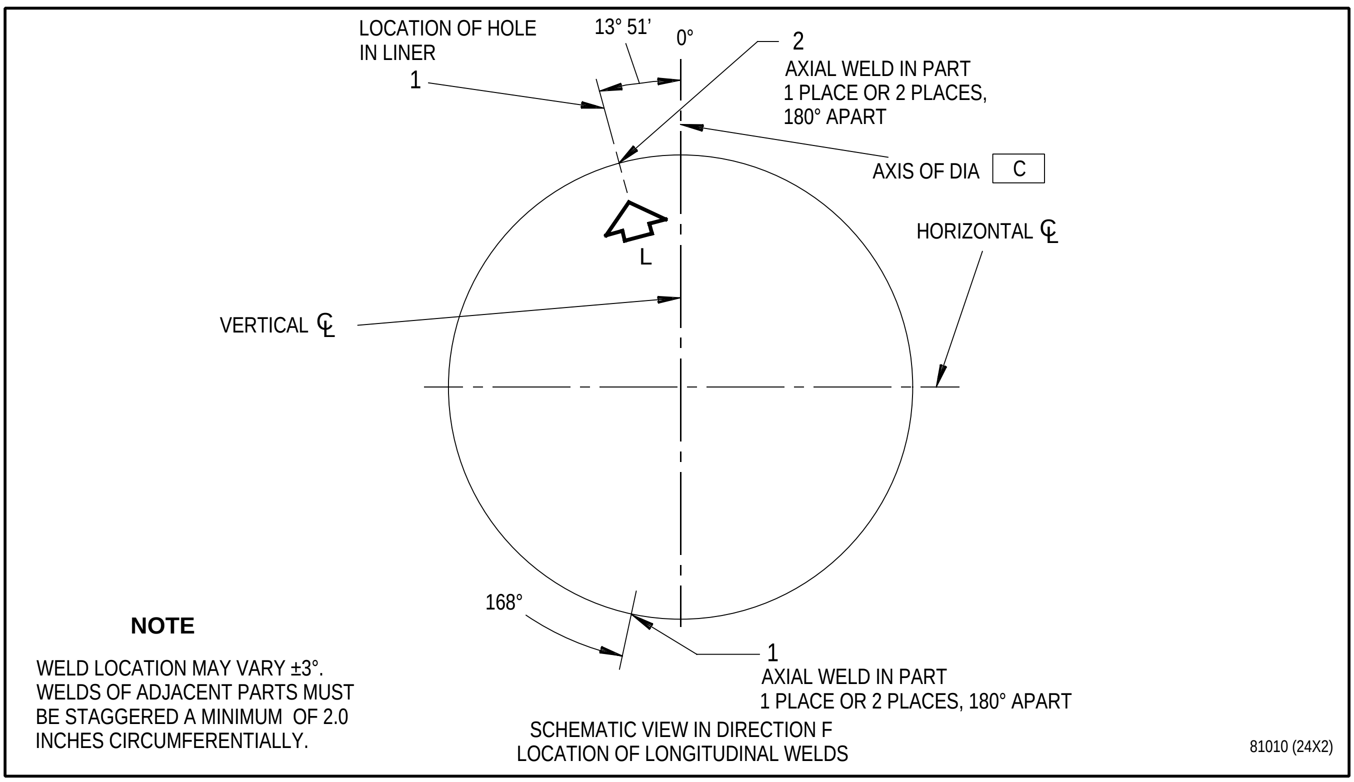


Figure 12. Augmentor Combustion Chamber Liner Assembly (Sheet 5 of 7)

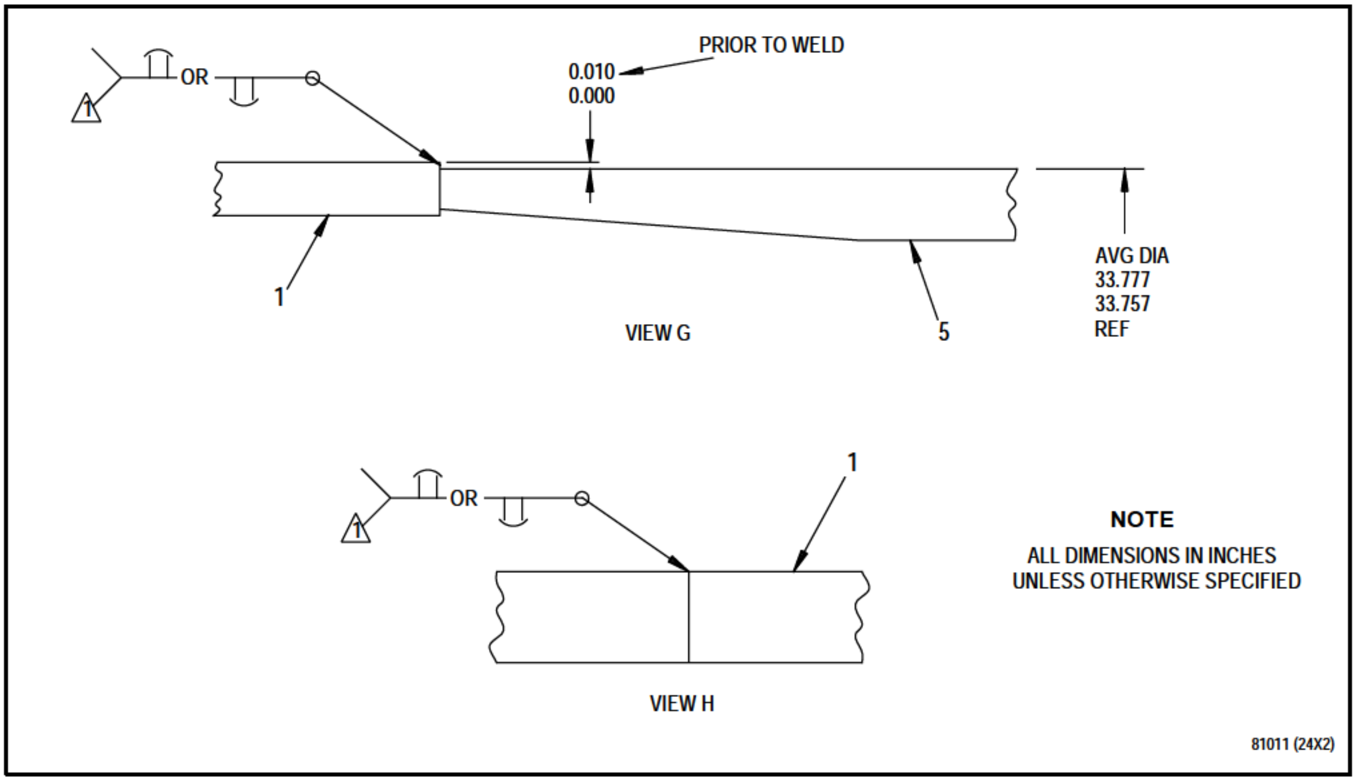


Figure 12. Augmentor Combustion Chamber Liner Assembly (Sheet 6 of 7)

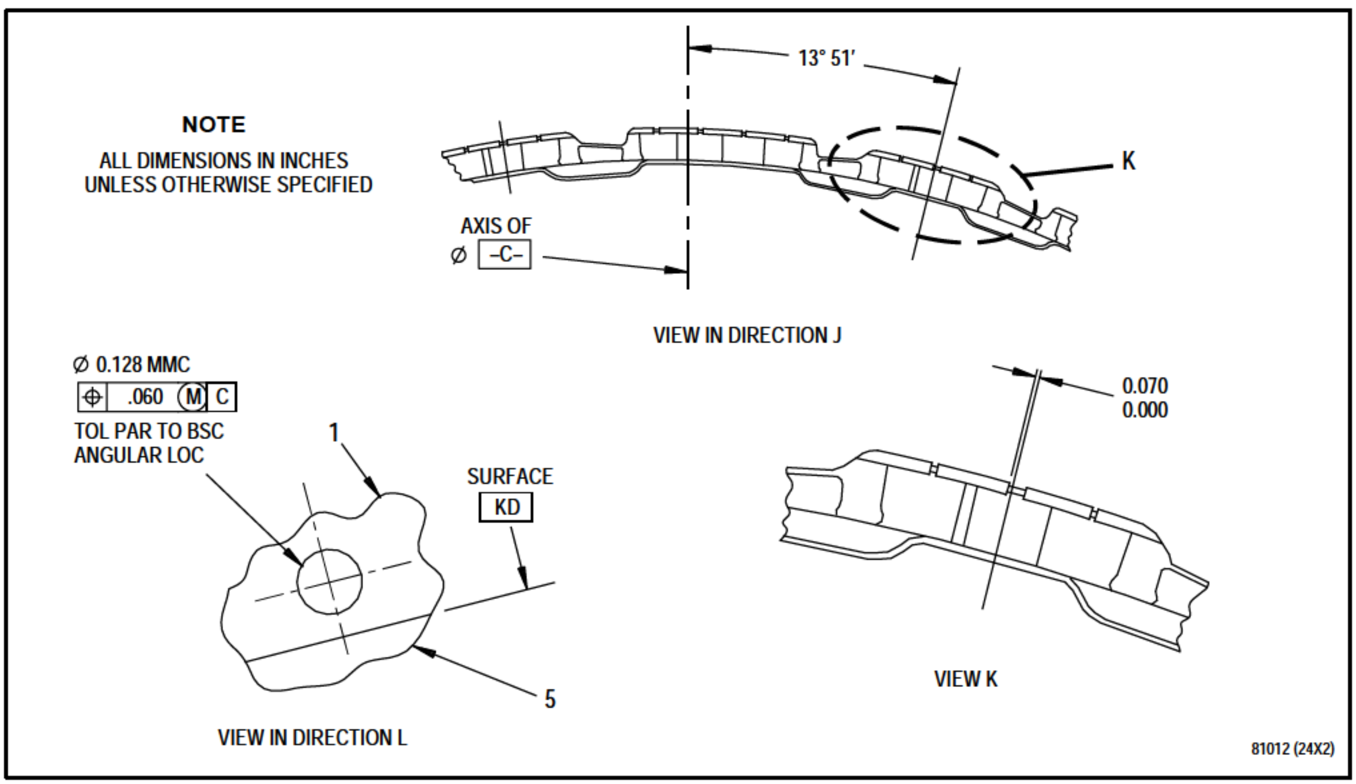


Figure 12. Augmentor Combustion Chamber Liner Assembly (Sheet 7 of 7)

Legend for figure 12

1. Liner subassembly, PN 4082663-01
2. Liner segment, PN 4047858
3. Seal assembly, PN 4060885
4. Louver assembly, PN 4071334
5. Liner subassembly (consists of 2, 3, and 4 above)
6. Liner subassembly
7. Includes 0.020 inch weld shrinkage allowance before welding
8. Includes 0.040 inch weld shrinkage allowance before welding
9. Centerline of existing butt weld

17. AUGMENTOR COMBUSTION CHAMBER LINER ASSEMBLY - LINER SEGMENT REPLACEMENT

(See Figure 13.)

a. Completely remove thermal barrier coating per paragraph 15.

NOTE

Seal assembly(3) and louver assembly(4) are reuseable.

b. Locate datums [A] , [B] , and [C] in figure 13 and View A and temporarily mark for future use. Refer to T.O. 2-1-111.

NOTE

Any parts that are to be reused must be used on the liner that they were removed from and in the same location from which they were removed.

c. Temporarily mark seal assembly(3) and louver assembly(4) as a set. Refer to T.O. 2-1-111.

d. Number, temporarily mark, and record, seal assembly and louver assembly relative positions. See figure 13, Views A and J. Refer to T.O. 2-1-111.

WARNING

To avoid eye injury or respiratory distress, wear eye protection and use respiratory protection during grinding and machining operations.

e. Grind off rivet manufactured heads, drift out rivets, and discard. See figure 13, View L.

f. Remove seal assembly(3) and louver asembly(4). See figure 13.

NOTE

Dimension marked (6) includes 0.020 inch weld shrinkage allowance before welding.

g. Remove liner segment(2) by machining through butt weld at surface [KD]. See figure 13 and View D.

h. Prepare existing liner subassembly(1) for welding per figure 13 and View E.

i. Remove all residual coating by polishing both sides, inner and outer, of liner subassembly(1) at surface [KD] using 180 to 360 grit crocus cloth or equivalent. Polished area should be a minimum of 0.100 inch wide. Liner must conform to dimensions in figure 13 and View E.

j. Clean areas to be welded on both subassembly(1) and liner segment(2), in figure 13 and View E. Refer to T.O. 2-1-111, SPOP 208, Method A.

NOTE

Parent material is PWA 1042 (Haynes 188).

k. Position replacement liner segment(2) per figure 13 and Views F and N.

l. Manual (MA) or Machine (ME) Gas Tungsten Arc Weld (GTAW). Refer to T.O. 2-1-111, PWA 16-7, and figure 13, View G. Use AMS 5801 filler material.

m. Heat treat liner assembly. Refer to T.O. 2-1-111, SPOP 465. Stepwise heat up can be omitted.

n. Locally fluorescent penetrant inspect weld 1 in figure 13 and View G, for cracks per SPOP 70 to SFPS 38. Refer to T.O. 2-1-111. No cracks permitted. If cracks are present, grind out cracks, weld crack area, heat treat liner, inspect welds per steps 17.j, 17.l, 17.m and 17.n.

o. Inspect rivets for looseness and reset as required. Refer to T.O. 2-1-111, PWA 357.

p. Replace louver assembly(4) and seal assembly(3), removed in step 17.f, as follows:

   (1) Locate seals and louver relative to each other from prior markings.

   (2) Position seals and louver per figure 13, dimension (5), and View P.

   (3) Transfer drill rivet and cooling holes and deburr. See View M.

   (4) Rivet. Refer to T.O. 2-1-111, PWA 357. See figure 13, View L.

q. Clean liner assembly inside diameter (area to be coated) per SPOP 208, method B. Refer to T.O. 2-1-111.

r. Coat liner assembly inside diameter with thermal barrier coating per paragraph 15.

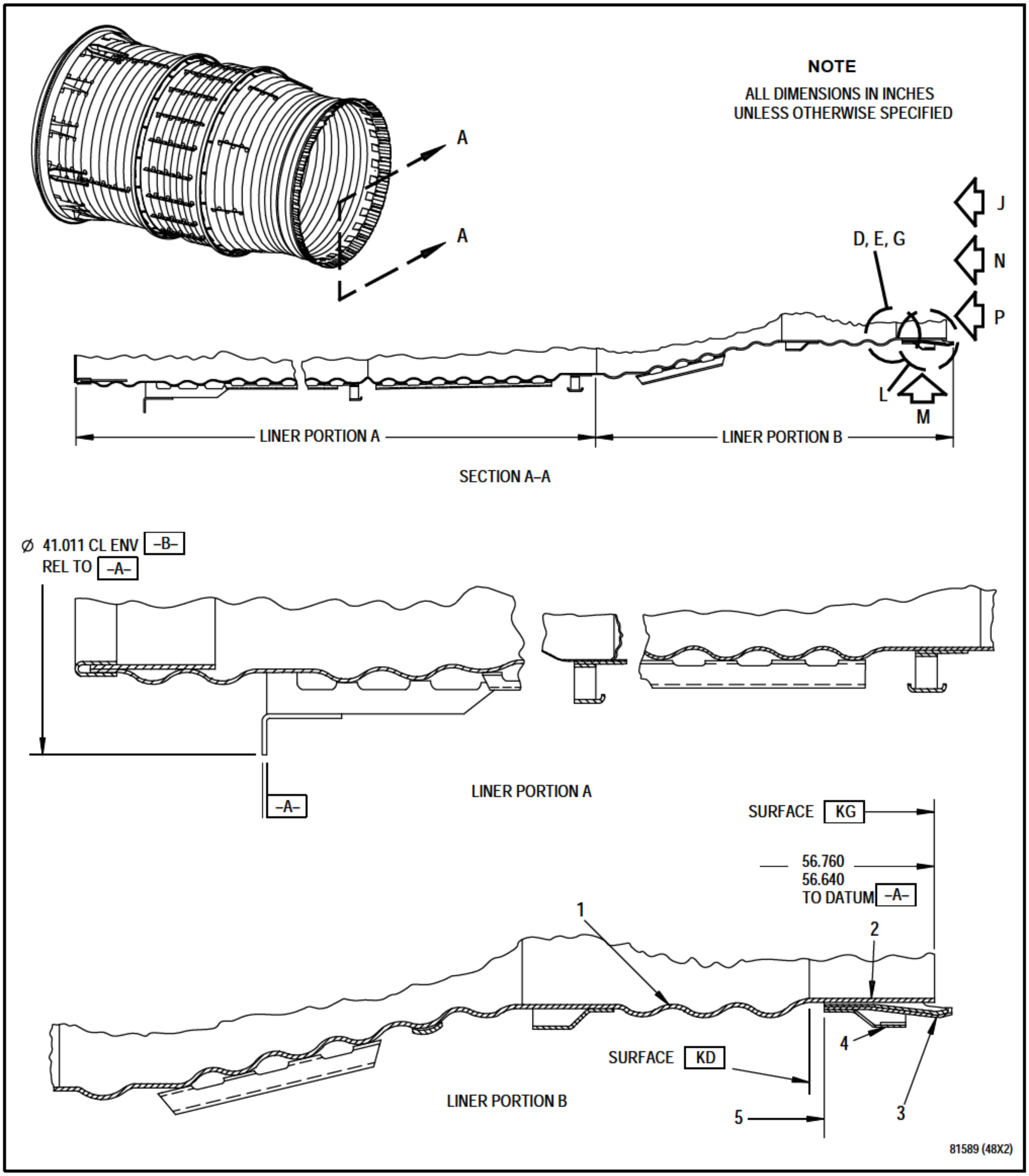


Figure 13. Augmentor Combustion Chamber Liner Assembly (Sheet 1 of 7)

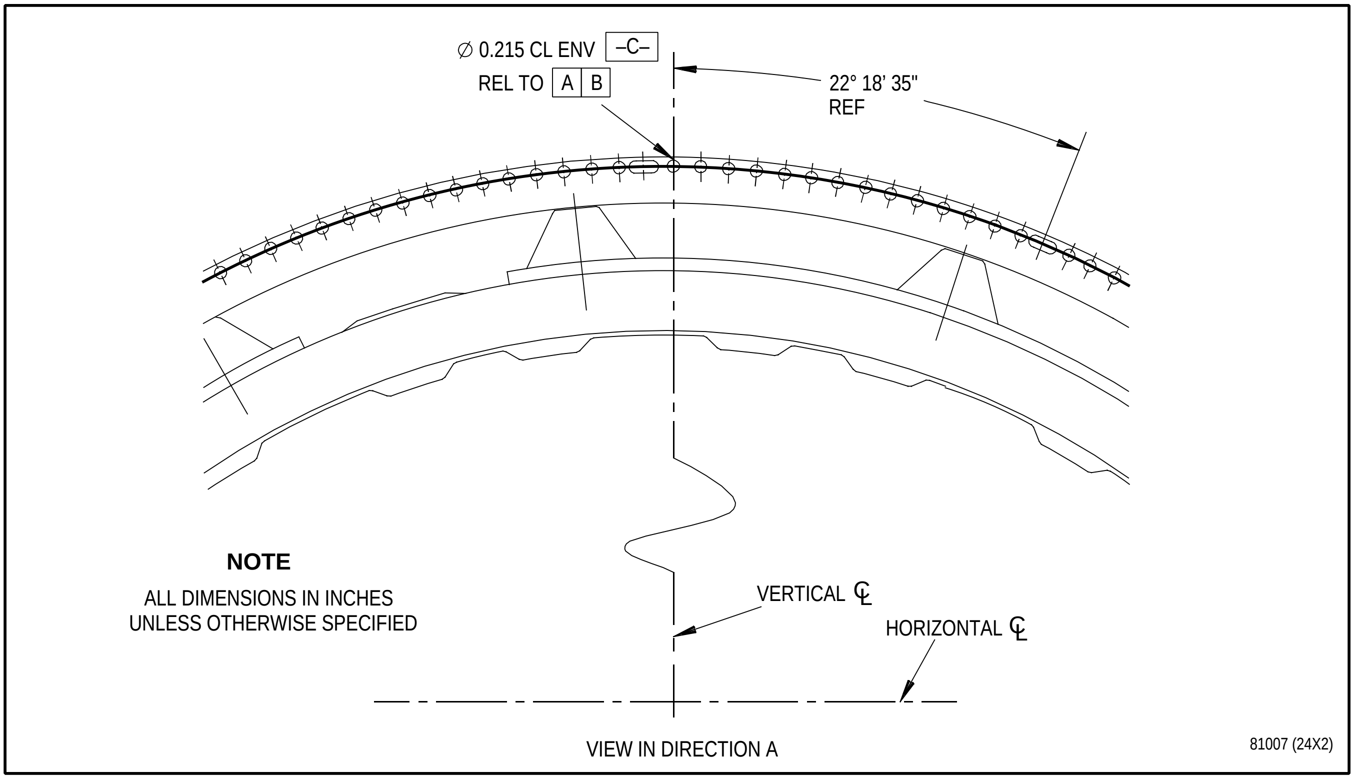


Figure 13. Augmentor Combustion Chamber Liner Assembly (Sheet 2 of 7)

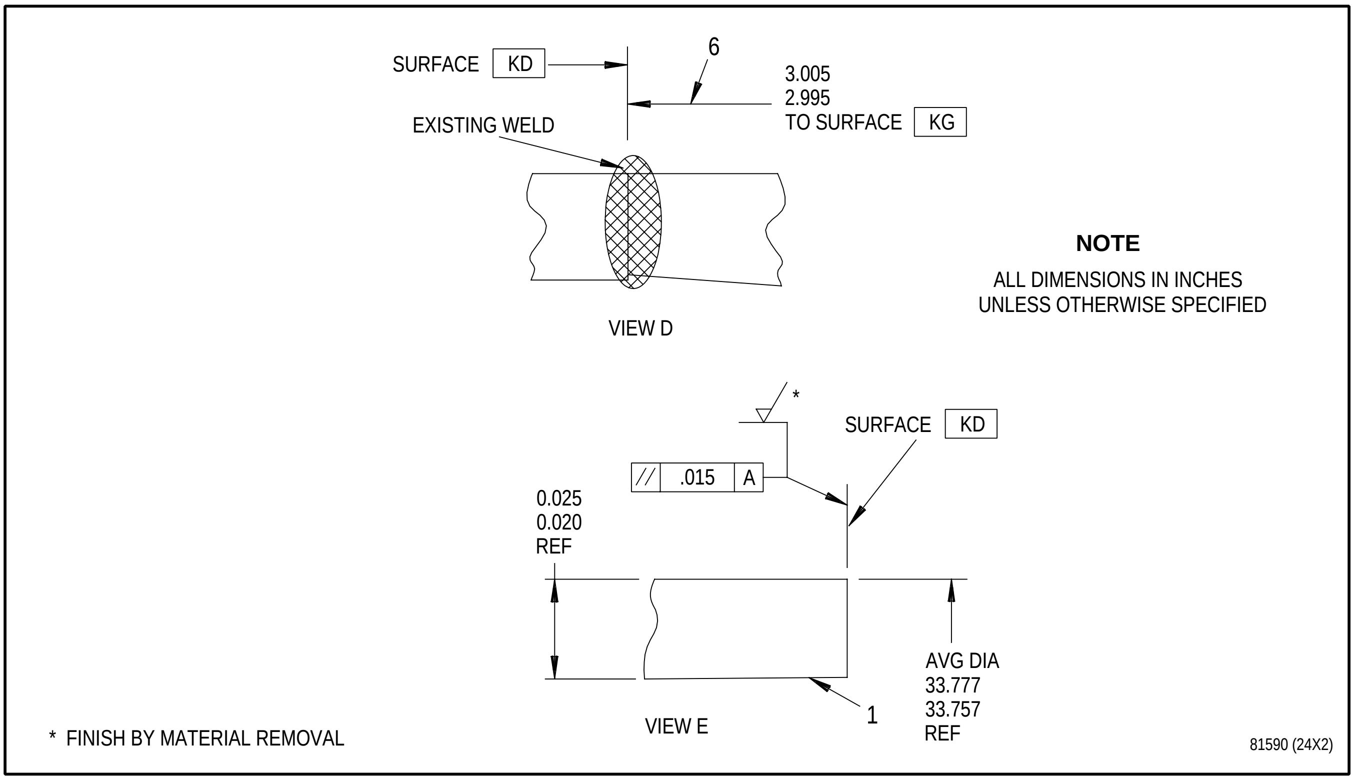


Figure 13. Augmentor Combustion Chamber Liner Assembly (Sheet 3 of 7)

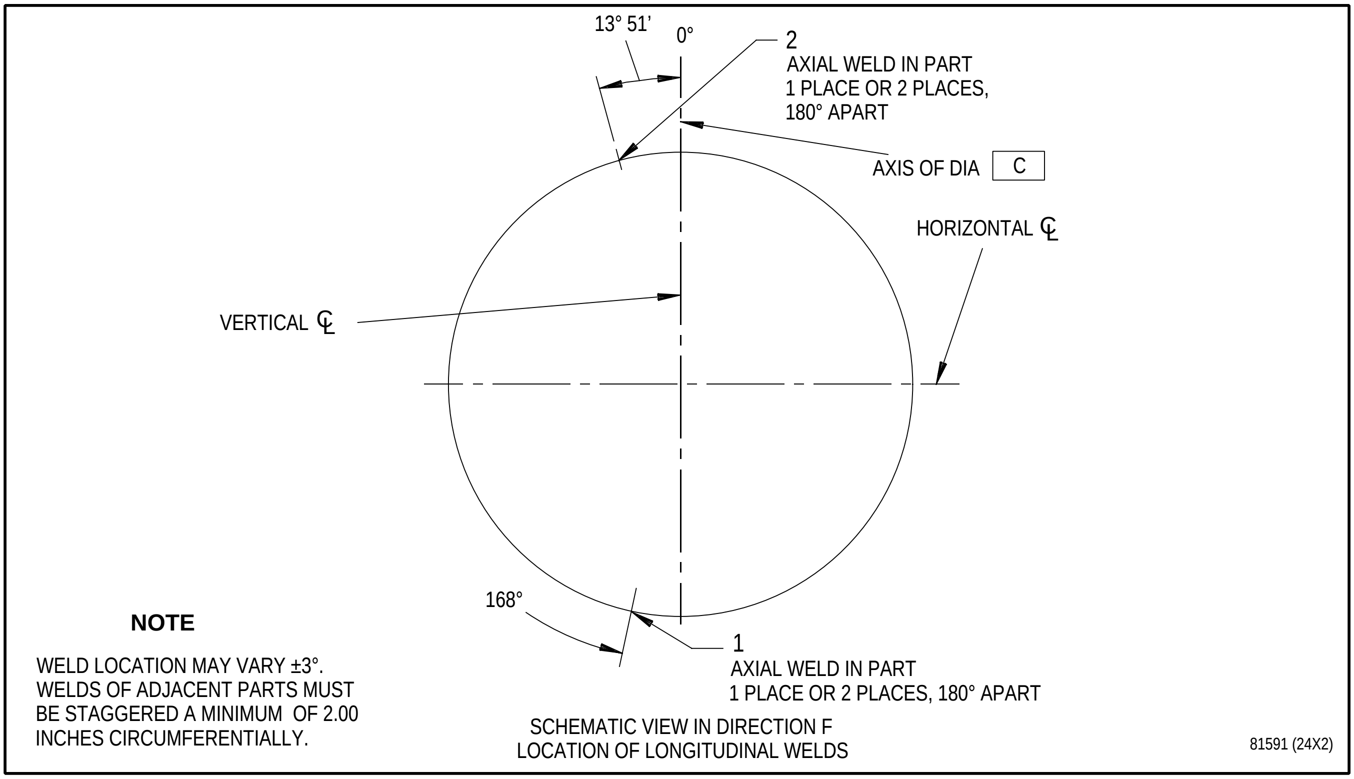


Figure 13. Augmentor Combustion Chamber Liner Assembly (Sheet 4 of 7)

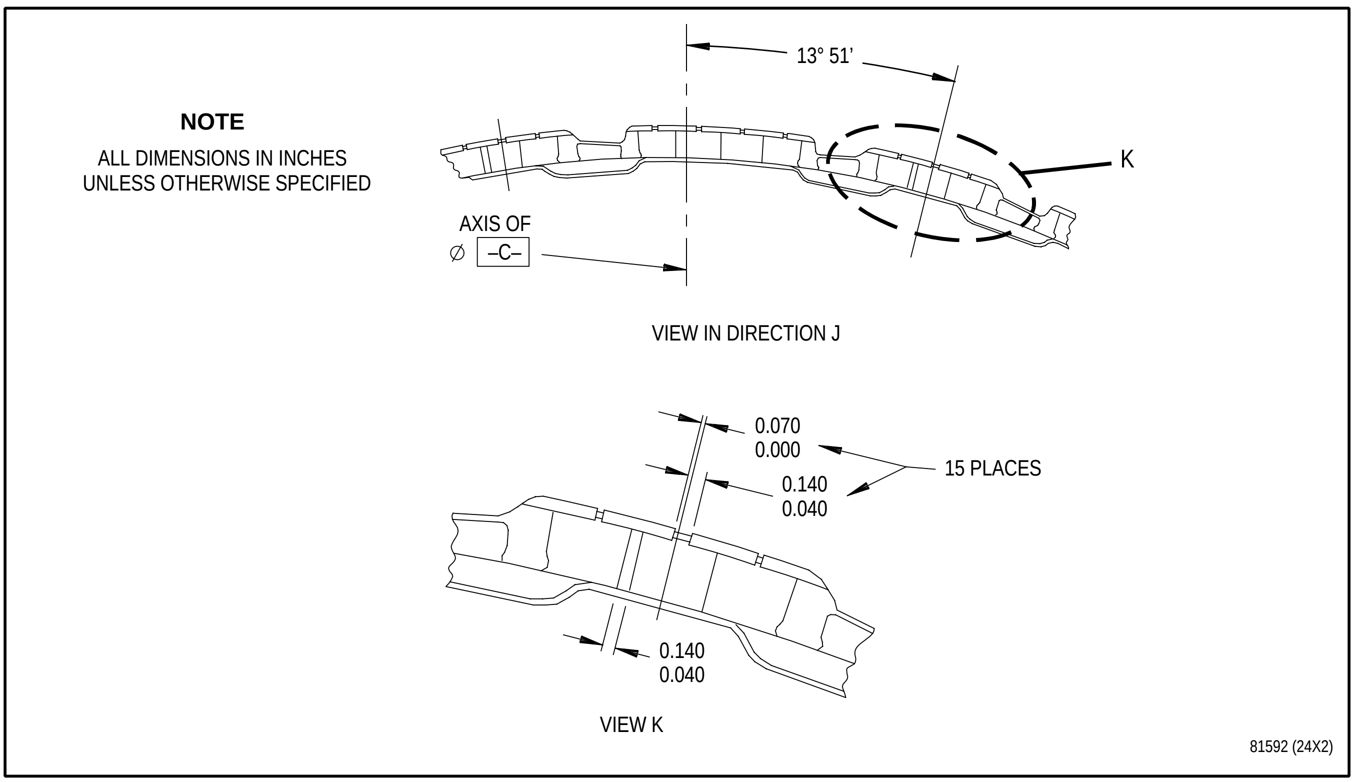


Figure 13. Augmentor Combustion Chamber Liner Assembly (Sheet 5 of 7)

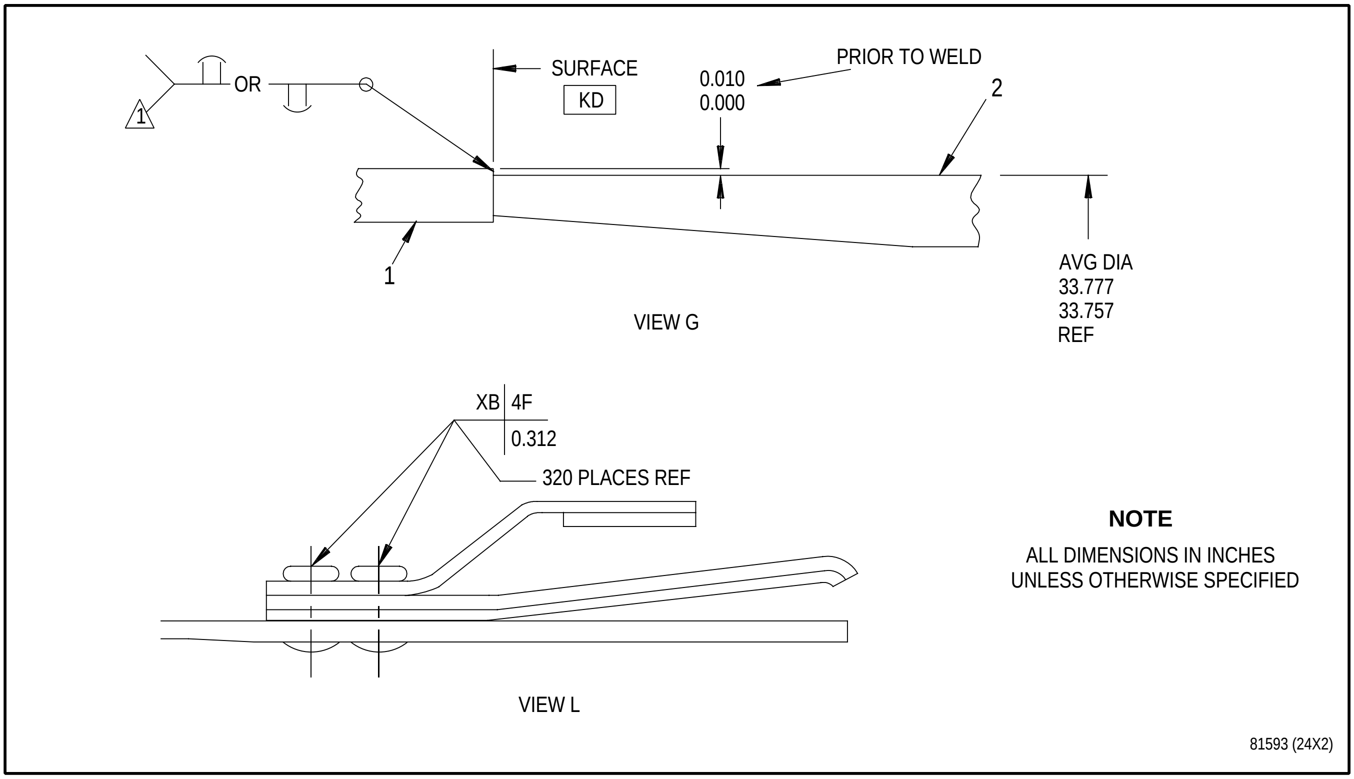


Figure 13. Augmentor Combustion Chamber Liner Assembly (Sheet 6 of 7)

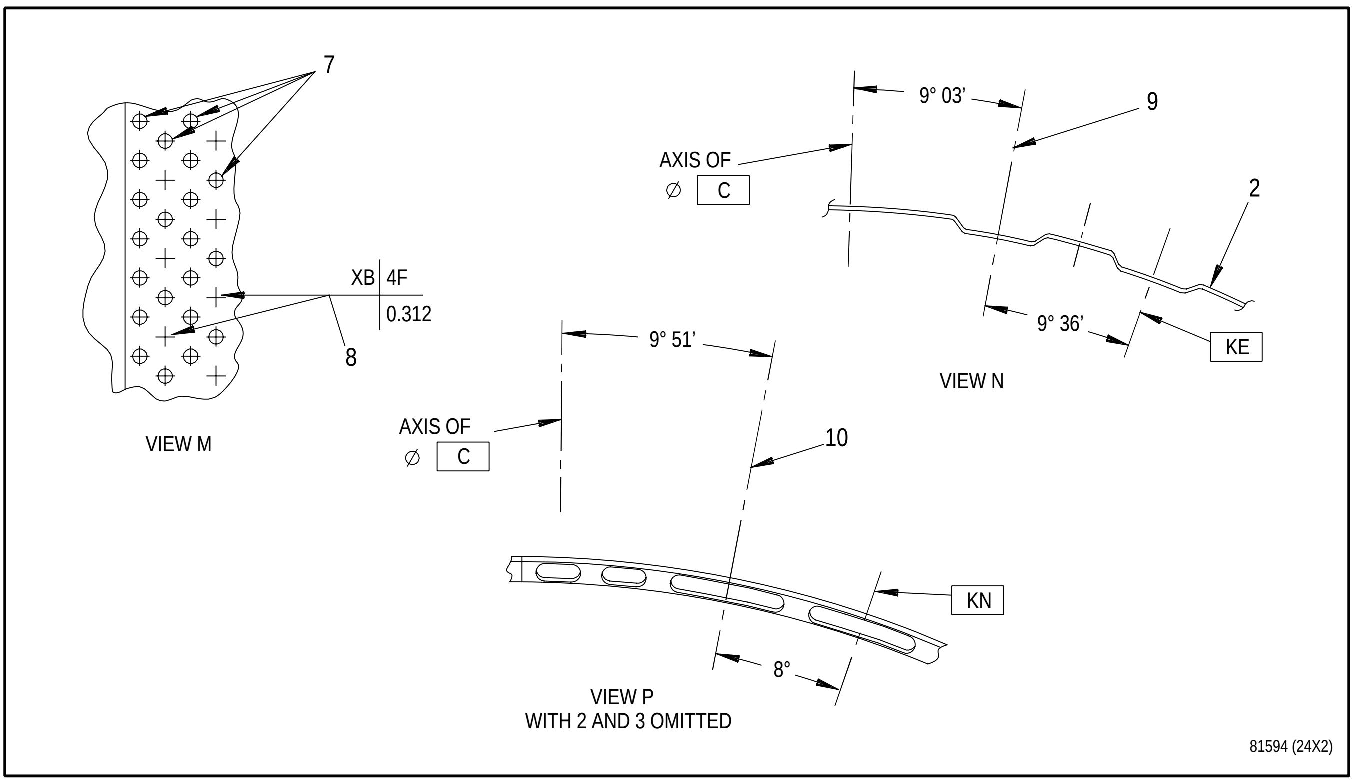


Figure 13. Augmentor Combustion Chamber Liner Assembly (Sheet 7 of 7)

Legend for figure 13

1. Liner subassembly, PN 4082663-01
2. Liner segment, PN 4047858
3. Seal assembly, PN 4060885
4. Louver assembly, PN 4071334
5. 53.980 to 53.920 inches from surface -A-
6. Includes 0.020 inch weld shrinkage allowance before welding
7. Four circumferential rows of 0.110 to 0.120 inch diameter holes through seal, louver, and liner.
8. Two rows of 160 rivets each through seal, louver, and liner, 320 places total.
9. Centerline of depression in liner segment(2), must be located within 0.030 inches either side of basic angular location in relation to surface -A- and diameter -B-. Next depression must be located at KE.
10. Centerline of 2.00 inch reference length slot in louver assembly(4), must be located within 0.030 inches either side of basic angular location in relation to surface -A- and diameter -B-, regardless of feature size. Next identical clockwise slot must be located at KN.

18. AUGMENTOR COMBUSTION CHAMBER LINER ASSEMBLY - LINER SUBASSEMBLY REPLACEMENT
(See Figure 14 and Table 1.)

a. Completely remove thermal barrier coating from area MB per paragraph 15.

b. Locate datums -A- , -B- , and -C- in figure 14 and View A and temporarily mark for future use. Refer to T.O. 2-1-111.

c. Remove liner subassembly(1) by machining through butt weld at surface KB. See figure 14 and View B.

d. Prepare existing liner subassembly(3) for welding per figure 14 and View C.

e. Remove all residual coating by polishing both sides, inner and outer, of liner subassembly(3) at surface KB using 180 to 360 grit crocus cloth or equivalent. Polished area should be a minimum of 0.100 inch wide. Liner must conform to dimensions in figure 14 and View C.

f. Clean areas to be welded on both subassemblies (1) and (3). Refer to T.O. 2-1-111, SPOP 208, method A.

g. Position replacement liner subassembly(1) per figure 14 and View N.

NOTE

Dimension(4) includes 0.020 inch weld shrinkage allowance before welding.

h. Inspect dimension(4) to verify replacement liner subassembly(1) is positioned correctly. Surface KB may be trimmed to meet dimension(4).

i. Manual (MA) or Machine (ME) Gas Tungsten Arc Weld (GTAW). Refer to T.O. 2-1-111, PWA 16-7, and figure 14, View H. Use AMS 5801 filler material.

j. Heat treat liner assembly. Refer to T.O. 2-1-111, SPOP 465. Stepwise heatup may be omitted.

k. Locally fluorescent penetrant inspect weld in figure 14 and View H for cracks. Refer to T.O. 2-1-111, SPOP 70. No cracks permitted. If cracks are present, grind out cracks, weld crack area, heat treat liner, and inspect welds per steps 18.i, 18.j, and 18.k.

l. Inspect rivets for looseness and reset as required. Refer to T.O. 2-1-111, PWA 357.

m. Clean liner assembly inside diameter (area to be coated). Refer to T.O. 2-1-111, SPOP 208, method B.

n. Coat liner assembly inside diameter with thermal barrier coating per paragraph 15.

o. Reidentify repaired liners, as required, by electrolytic etch marking reidentified liner PN in area of existing PN. Refer to T.O. 2-1-111, SPOP 401. Use Table 1 to determine reidentified PN.

Table 1. Augmentor Combustion Chamber Liners - Reidentified PNs

Existing PN	Repaired PN
4083169-01	4083169-01
4080412-01	4083169-01
4081214-01	4083180-01
4079666-01	4083181-01
4083180-01	4083180-01
4083181-01	4083181-01
4083182-01	4083182-01

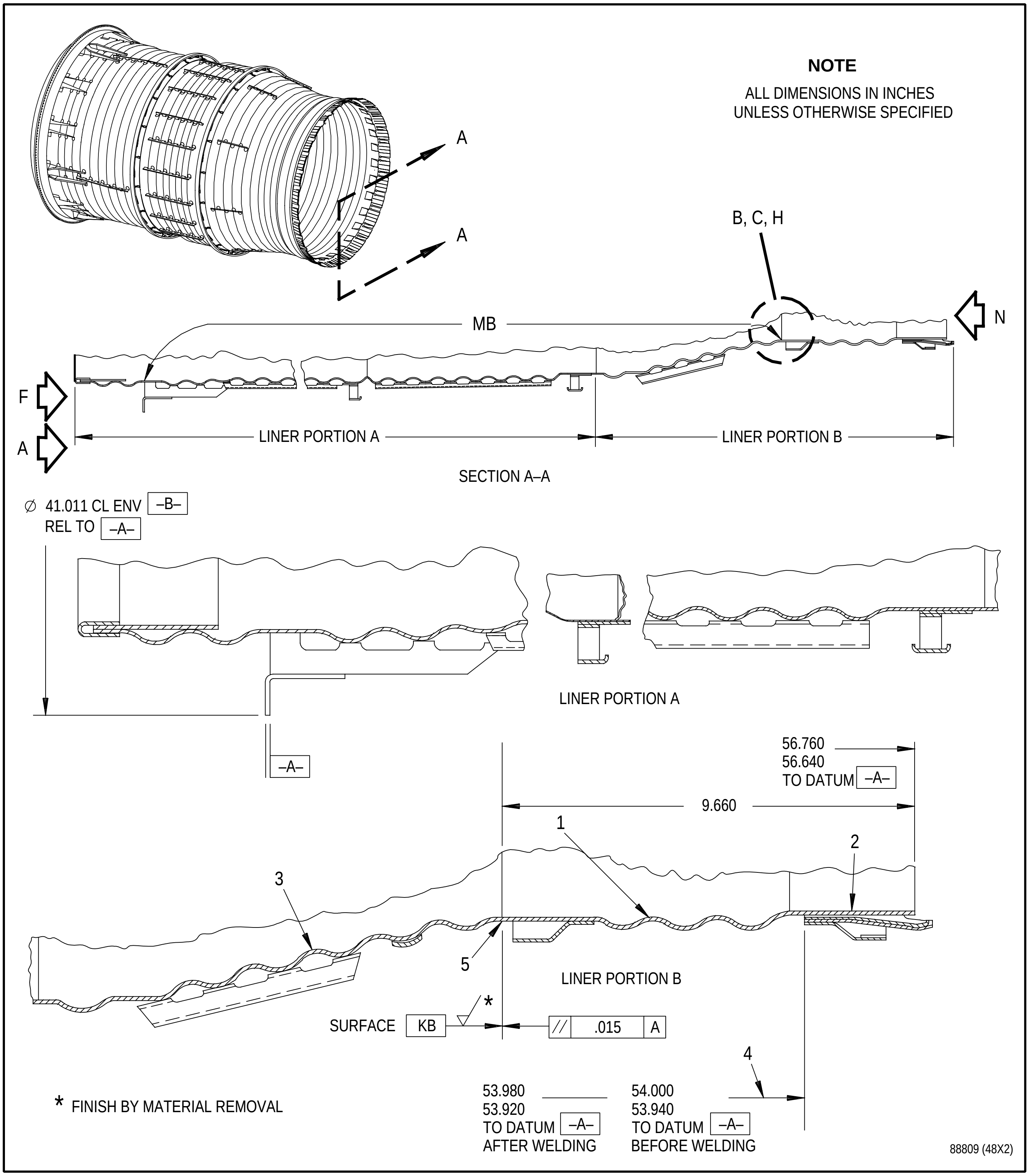


Figure 14. Augmentor Combustion Chamber Liner Assembly (Sheet 1 of 4)

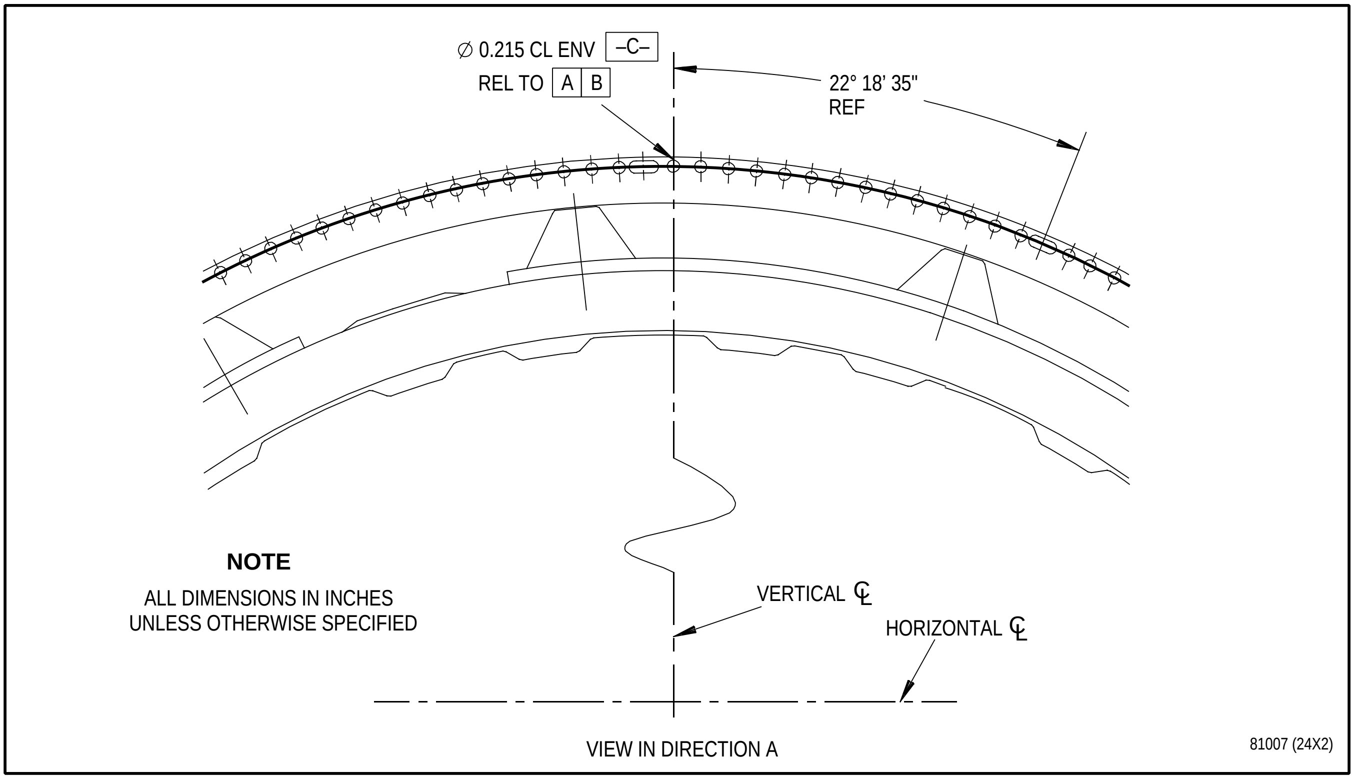


Figure 14. Augmentor Combustion Chamber Liner Assembly (Sheet 2 of 4)

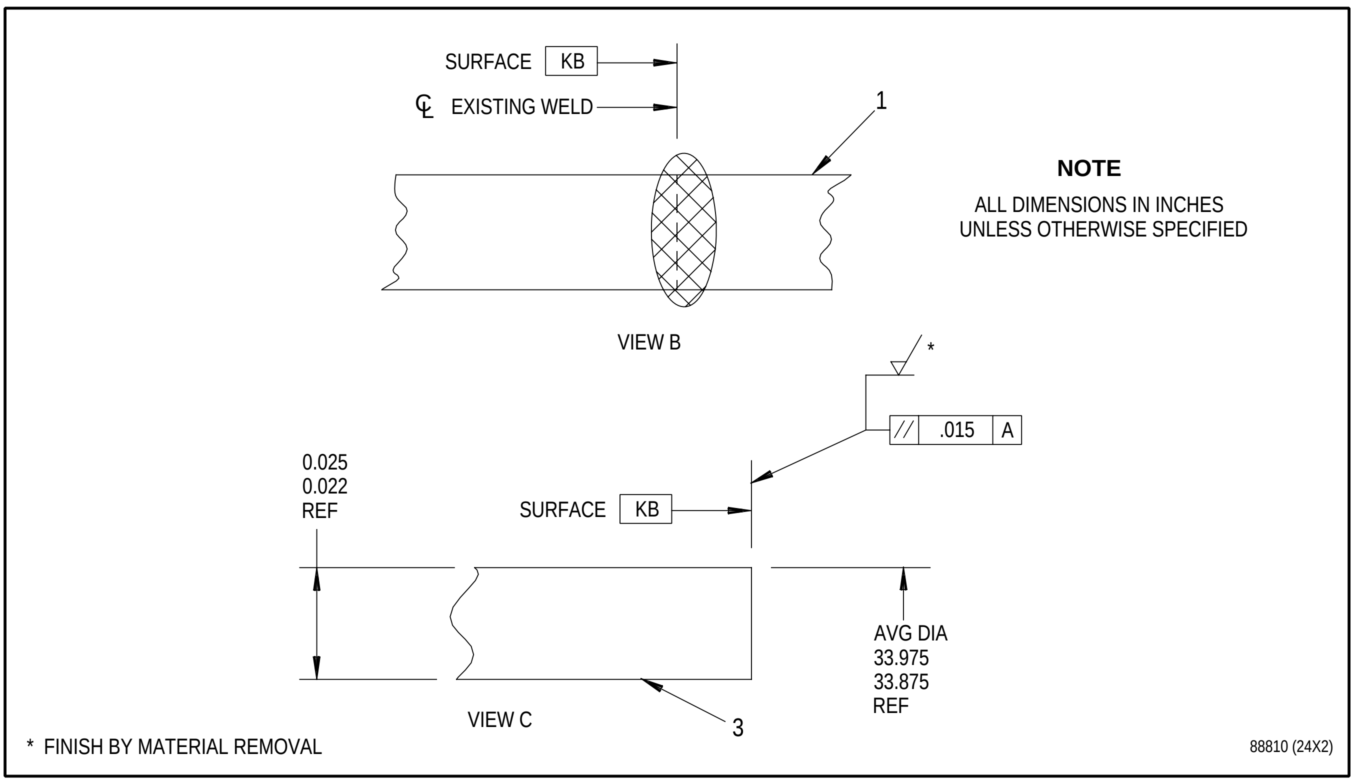
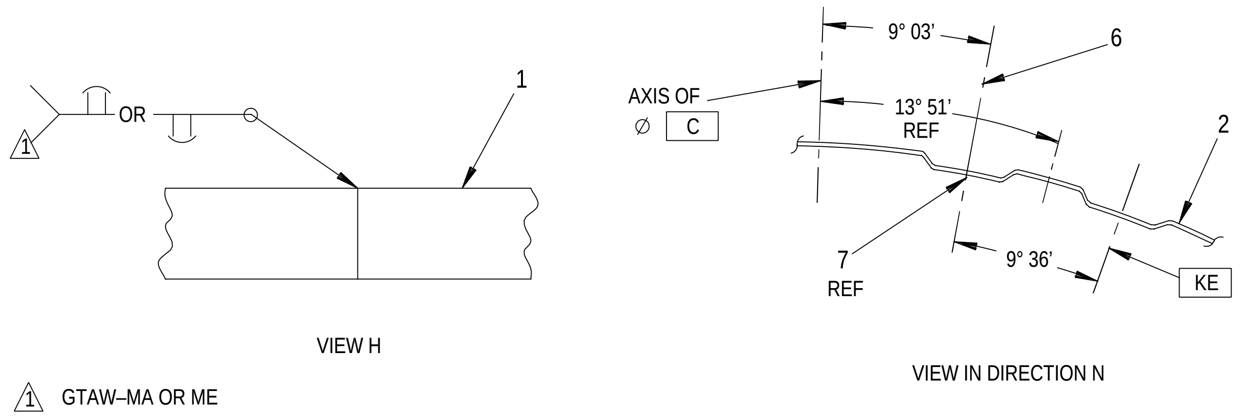


Figure 14. Augmentor Combustion Chamber Liner Assembly (Sheet 3 of 4)



1. Liner subassembly
2. Liner segment
3. Liner subassembly
4. Includes 0.020 inch weld shrinkage allowance before welding
5. Center line of existing butt weld
6. Centerline of depression in liner segment(2), must be located within 0.030 inches either side of basic angular location in relation to surface -A- and diameter -B-. Next depression must be located at KE.
7. Axial weld in liner segment(2), 1 place or 2 places, 180° apart

Figure 14. Augmentor Combustion Chamber Liner Assembly (Sheet 4 of 4)

19. FOLLOW-ON MAINTENANCE.

a. Install augmentor combustion chamber liner in augmentor duct and nozzle module per WP 701 00.

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL ASSEMBLY, AUGMENTOR DIVERGENT NOZZLE SEGMENT -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 44

PAGE NO.	CHANGE NO.
1 - 2	24
3	19
4 - 7	0
8 - 13	19
14 - 22	0
23	19
24 - 30	0
31 - 32	24
33	0
34 - 38	19
38A - 38B Added	19
39 - 40	9
41 Added	9
42 Blank Added	0

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Vapor Degreasing	SPOP 3
Precipitation Heat Treat Cycle 12A	SPOP 465
Power Denicking and Buffing of Steel, Nickel, and Cobalt Base Parts	SPOP 533
Standard Fluorescent Penetrant Inspection	SPOP 62
Standard Fluorescent Penetrant Inspection (Local Application)	SPOP 70
Solution Heat Treat Cycle 101	SPOP 761
Solution Heat Treat Cycle 102	SPOP 762
Stabilization Heat Treat Cycle 103	SPOP 763
Nondestructive Inspection	T.O. 2J-F100-9
Introduction and General Information	T.O. 2J-F100-53-1
Buffing, Power Denicking of Steel, Nickel, or Cobalt Parts (SPOP 533)	SWP 091 02
General Repair Procedures - Welding, Inert Gas Fusion	SWP 093 01
Heat Treatment: Solution, Stabilization, or Precipitation Cycles (SPOP 465, 468, 470, 480, 481, 482, 761, 762, 763, 764, 765, 766, and 767)	SWP 095 01
General Repair Procedures - Plasma and Flame Spray Coating Procedures, General	WP 096 00
Qualified Repair Source List (QRSL)	WP 600 00
Qualified Repair Source List (QRSL) Augmentor Module	WP 606 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, ANTIGALLING	ESNALUBE 382 (PWA 36545)
GRIT, ALUMINUM OXIDE	120 TO 150 GRAIN SIZE
PERCHLOROETHYLENE	O-T-236 (PMC 9015)
WIRE, WELDING	AMS 5828
WIRE, WELDING	AMS 5832

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
RIVET	AN123336	AR
RIVET	AN123619	AR
RIVET	ST1219-102	AR
RIVET	ST1219-156	AR

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
7	AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - FORWARD OR REAR GUIDE REPLACEMENT	
	FIXTURE, DRILL, SEAL, AUGMENTOR DIVERGENT NOZZLE SEGMENT -	PWA 71028
18	AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - HINGE REPLACEMENT	
	FIXTURE, DRILL, SEAL, AUGMENTOR DIVERGENT NOZZLE SEGMENT -	PWA 71028

ILLUSTRATED SUPPORT EQUIPMENT

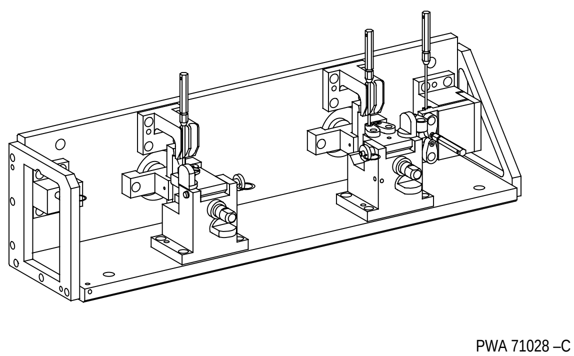


Figure T1.   PWA 71028 FIXTURE

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor divergent nozzle segment seal.

2. AUGMENTOR DIVERGENT NOZZLE SEGMENT SEAL - REPAIR OF CRACKS IN ZONE E.

(See Figure 1.)

a. Stop drill crack using No. 50 drill bit.

b. Locally fluorescent penetrant inspect repair area. No cracks allowed. Refer to T.O. 2J-F100-9.

3. AUGMENTOR DIVERGENT NOZZLE SEGMENT, SEAL EDGE - BLEND REPAIR.

(See figure 1.)

a. Blending requirements are as follows:

(1) All local blending shall extend to a distance of at least 15 times depth of damage from center of blend.

(2) Surface finish of all blends shall be as smooth or smoother than original finish.

b. Blend repair unserviceable nicks and tears in seal edge as follows. Refer to T.O. 2J-F100-53-1, SWP 091 02 (SPOP 533).

(1) Use fine stone.

(2) Remove raised metal as required.

(3) Use minimum radius of 0.250 inch.

c. Fluorescent penetrant inspect after all blending. Refer to T.O. 2J-F100-9.

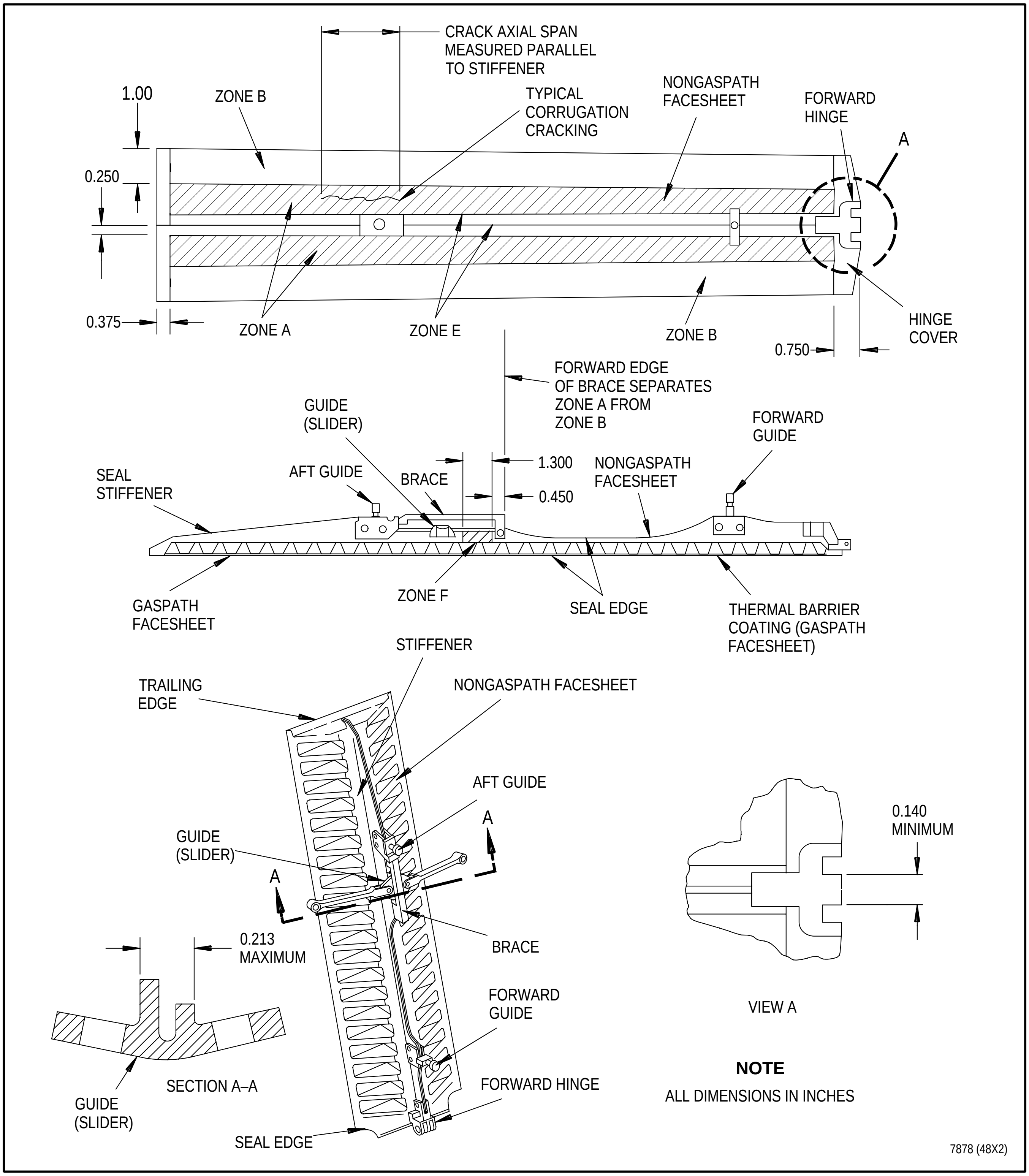


Figure 1. Augmentor Divergent Nozzle Segment Seal - Repair

4. AUGMENTOR DIVERGENT NOZZLE SEGMENT SEAL BRACE - REPLACEMENT.
(See Figure 2.)

a. Remove rivet attaching brace(3) to segment seal. Remove brace(3) and guide(8).

b. Install brace and locate rivet hole per dimensions(1 and 5). Drill rivet hole through brace.

NOTE

Do not rivet brace until guide has been installed.

c. Install guide(8); then brace(3). Rivet brace per T.O. 2-1-111.

5. AUGMENTOR DIVERGENT NOZZLE SEGMENT SEAL GUIDE (PN 4050490) - REPLACEMENT.
(See figure 2.)

a. Drill out rivet and remove brace(3) then guide(8).

b. Drill out rivets(10) attaching connecting links(7) and spacers(9) to guide(8).

c. Install spacers(9) in guide(8). Install connecting links(7). Rivet per T.O. 2-1-111. Inspect rivet installation. Rivet must not rotate in connecting link using hand pressure.

d. Install guide(8) on segment seal. Install brace(3) per paragraph 5.

6. AUGMENTOR DIVERGENT NOZZLE SEGMENT SEAL GUIDE CONNECTING LINK (PN 4050494) - REPLACEMENT.
(See figure 2.)

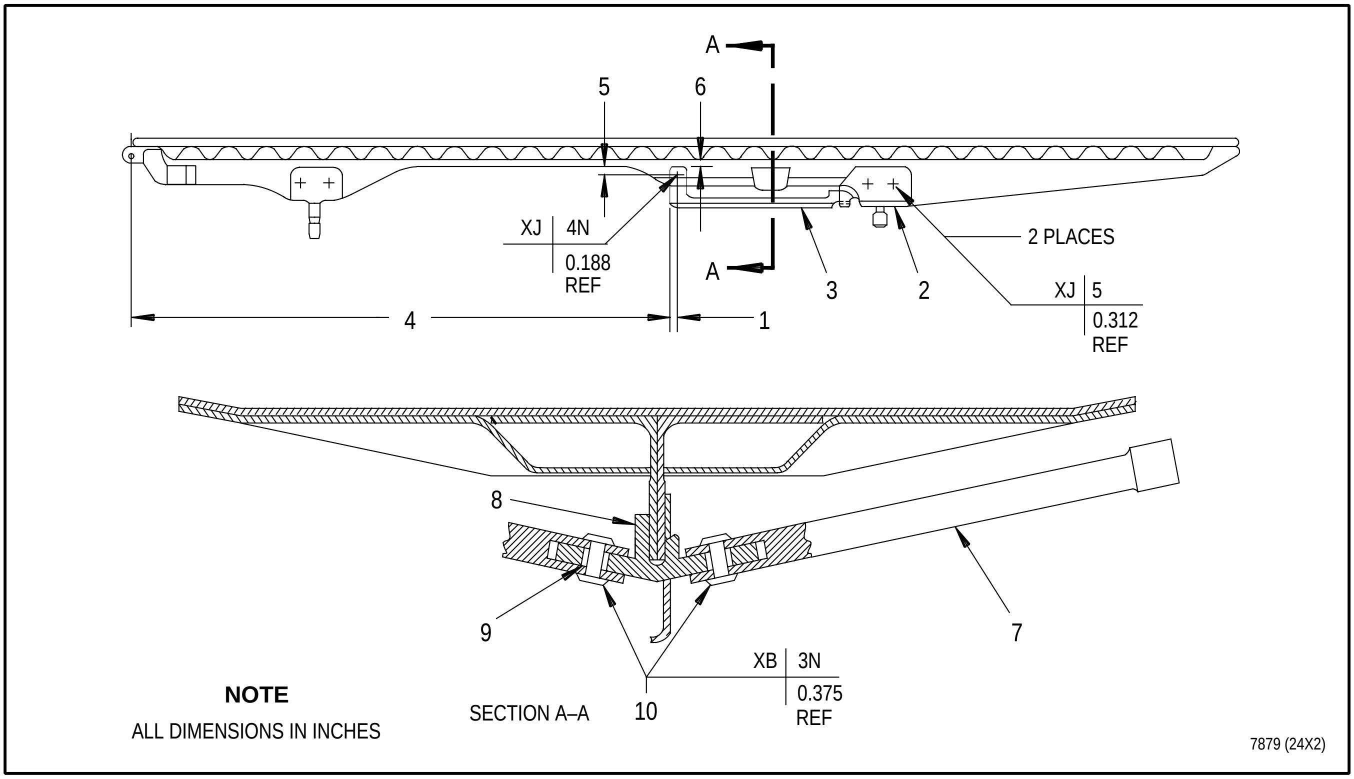
a. Remove rivet attaching brace(3) to assembly. Remove brace(3) and guide(8).

b. Remove rivets(10) attaching connecting links(7) and spacers(9) to guide(8).

c. Assemble guide(8), spacers(9), connecting links(7) and rivets(10) per figure 2.

d. Rivet per T.O. 2-1-111. Inspect rivet installation. Rivets(10) must not rotate relative to connecting links(7) using hand pressure.

e. Install guide(8) on seal assembly. Install brace(3) and secure with rivet per T.O. 2-1-111.



1. 0.150 inch
2. Guide (rear)
3. Brace
4. 10.045 to 10.075 inches
5. 0.200 inch
6. 0.040 to 0.060 inch
7. Connecting link
8. Guide (slider)
9. Spacer, 2 required
10. Rivets, 2 required

Figure 2. Augmentor Divergent Nozzle Segment Seal Brace - Parts Replacement

7. AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - FORWARD OR REAR GUIDE REPLACEMENT.

(See Figures 3 and 7.)

a. Remove augmentor divergent nozzle seal segment rear guide(1, figure 3) or forward guide(2) from augmentor divergent nozzle seal segment(3) by drilling and pushing out rivets(4).

b. Open PWA 71028 drill fixture storage container and loosen three screws securing fixture. Rotate three clamps so that fixture can be removed. Install two 0.625-11 lift eyes on base(6) at holes stamped LIFT HERE ONLY.

c. Using a hoist, lift fixture from storage container and place on clean flat work surface. Inspect for any missing details which may impair integrity of tool. Leave details in storage container until needed.

d. Fold aft divergent segment guide slider arms(5) either forward or aft to facilitate loading of divergent seal segment.

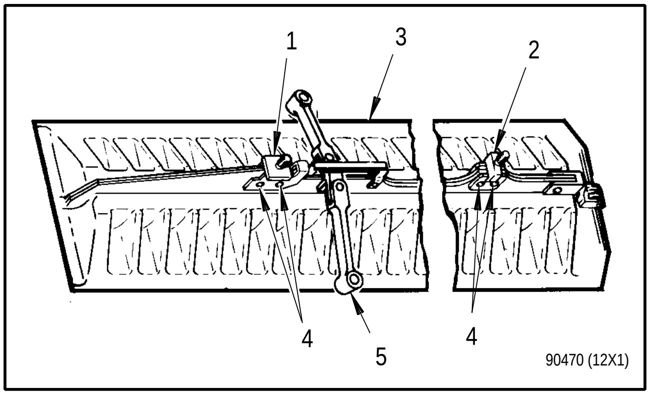


Figure 3. Augmentor Divergent Nozzle Seal Segment Guide Replacement (Sheet 1 of 7)

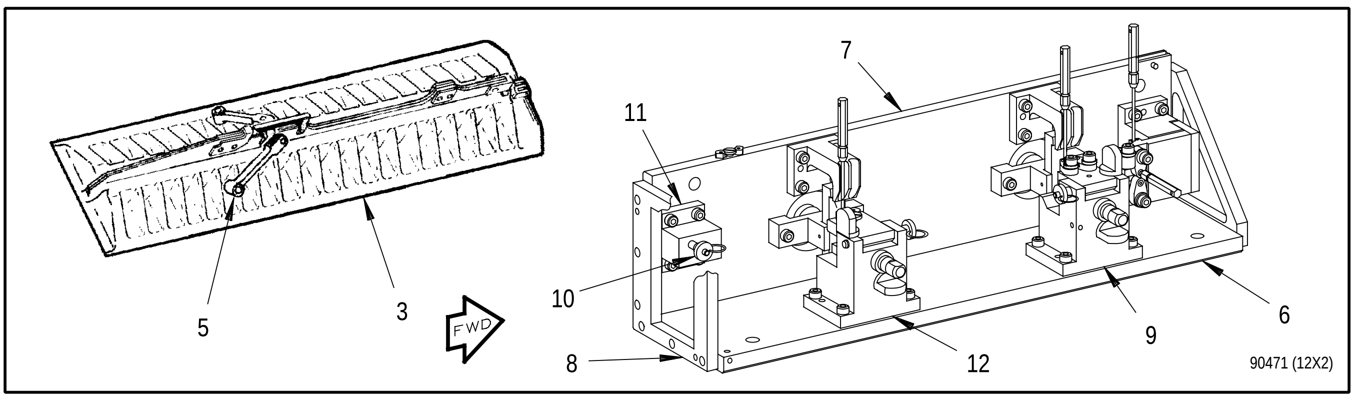


Figure 3. Augmentor Divergent Nozzle Seal Segment Guide Replacement (Sheet 2 of 7)

e. Install divergent segment seal, forward end first, through base gusset(8). Corrugated side should face away from base(7).

f. Slide segment toward forward hinge support block(9) until aft locator quick release pin(10) can be installed into end stop block(11). Slide segment back so aft edge contacts aft locator pin.

g. Adjust two swivel head screws(13) until clamp bar(14) positions segment gage points against four tooling balls(15). The segment backbone should also rest on two tooling balls(16).

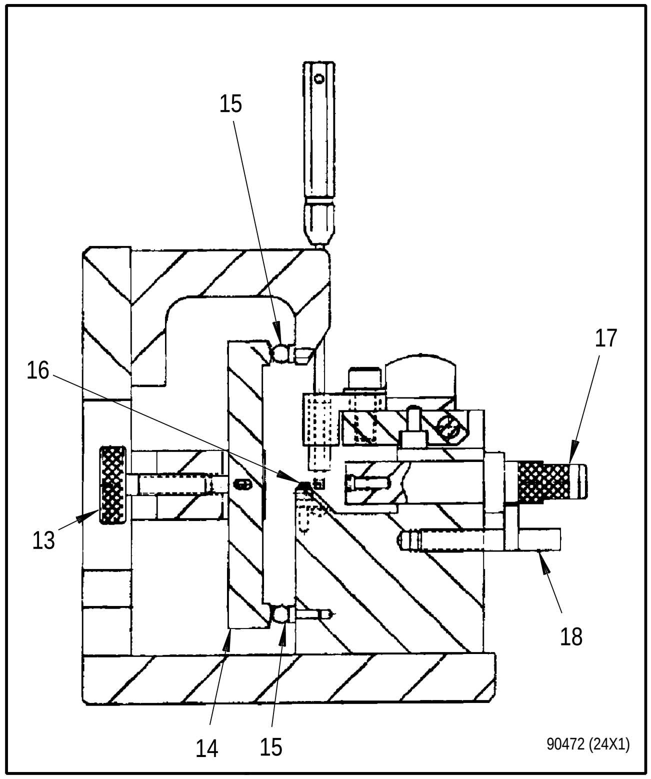


Figure 3. Augmentor Divergent Nozzle Seal Segment Guide Replacement (Sheet 3 of 7)

NOTE

- Only one guide post can be aligned and drilled at a time.
- Use adjustable drill plate (PWA 71028, item 27 or 58) if rivet holes exist in segment backbone. Go to step h.
- Use fixed drill plate (PWA 71028, item 53) if no holes exist in segment (part has been weld repaired) or replacement guide. Go to step i.

h. Align adjustable drill bushings to replace forward or aft guide post in segment with existing hole as follows:

NOTE

PN 4041274 and 4050493 segment assemblies use PN 4034411 and 4035394 guides (small diameter post). PN 4057829 segment assembly uses PN 4057221 and 4057748 guides (large diameter post).

(1) Install appropriate drill plate assembly(19) (large or small diameter rivet holes) by positioning drill plate on either the forward(9) or aft(12) support block and inserting quick release pin(20) through support block and drill plate.

(2) Lower adjustable leaf(21) until rest button(22) contacts face of support block(9). Secure in place using half-turn screw(23).

(3) Loosen two socket head cap screws(24) in adjustable leaf(21) so each adjustable drill plate(25) is free to rotate.

(4) Align two guide post adjustable bushings with existing 3/16 or 5/32 inch diameter rivet holes by installing 0.1285 inch diameter gage pin assembly(26) marked [B] or 0.1590 inch diameter gage pin assembly(26) marked [D].

(5) Secure each adjustable drill plate(25) in place by tightening socket head cap screw(24). Continue to adjust drill plate until gage pin installs smoothly into rivet hole after drill plate is secured in place.

(6) Loosen half-turn screw(23) and rotate adjustable drill plate assembly(19) out of the way.

(7) Go to step k.

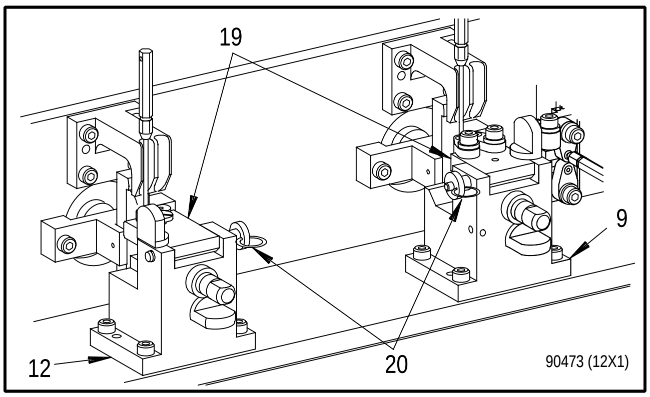


Figure 3. Augmentor Divergent Nozzle Seal Segment Guide Replacement (Sheet 4 of 7)

i. When using fixed leaf(28) to replace guide post in segment with no holes, verify the correct bushings are installed in the fixed leaf. Use 0.1285 inch ID or 0.1590 inch ID bushings(29 or 30) as required.

CAUTION

Failure to install bushings correctly as pairs in right and left handed positions will prevent bushings from being secured with lockscrew and cause holes to be mislocated.

j. Change fixed/renewable drill bushings as follows:

(1) Loosen lock screw(27) in fixed leaf(28) and rotate and lift the two bushings(29) from the fixed leaf.

(2) Loosen lock screw(30) in top of base(7). Rotate two drill bushings(31) and remove from base storage location.

(3) Install correct drill bushings into fixed leaf(28) and lock in place by tightening lock screw(27). Bushings must be installed in right and left pairs in the correct position or they will not be secured by lock screw.

(4) Install other two drill bushings into top of base(7) and secure with lock screw(30).

k. Install replacement guide post onto locator as follows:

(1) Place the correct replacement hinge (either forward guide PN 4057221 or PN 4035394 or aft guide PN 4057748 or PN 4034411) onto segment seal backbone.

NOTE

PN 4041274 and 4050493 segment assemblies use PN 4034411 and 4035394 guides (small diameter post). PN 4057829 segment assembly uses PN 4057221 and 4057748 guides (large diameter post).

(2) Install locator pin(17) appropriate to guide post diameter, 0.190-32 for small posts and 0.250-28 for large posts, through 0.625 inch diameter hole in either forward or aft guide post locator blocks(9 or 12).

(3) Thread replacement guide post onto locator pin(17) until guide post face contacts locator pin face.

(4) Secure locator pin in place by tightening the half-turn screw(18).

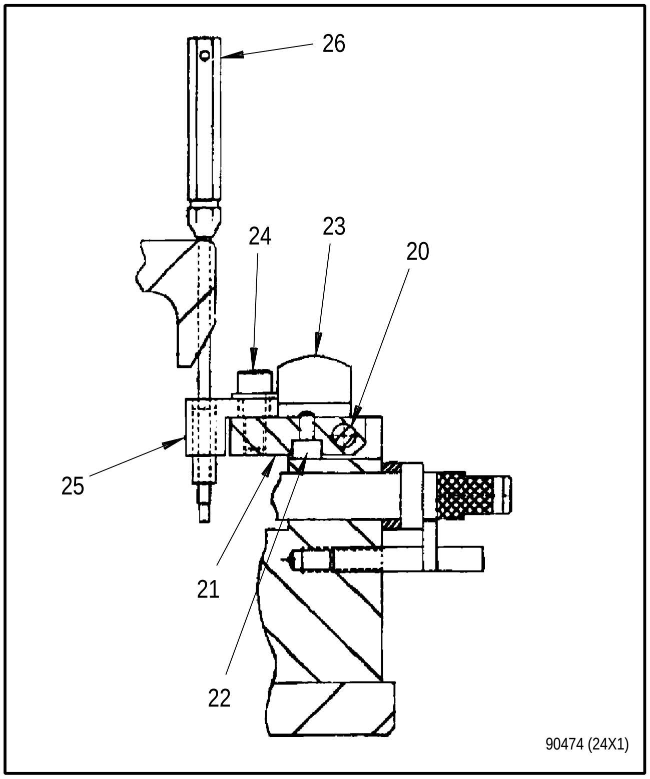


Figure 3. Augmentor Divergent Nozzle Seal Segment Guide Replacement (Sheet 5 of 7)

(5) Lower drill plate rest button(22) until it contacts face of support block. Secure in place using half-turn screw(23).

l. Drill correct size hole through replacement detail and (if not previously drilled) divergent segment seal. Use cutting oil to prevent overheating of drill bit or local hardening of details. Use of carbide drill bits and slow drill press speed is recommended.

m. Loosen two half-turn screws(18 and 23).

n. Remove quick release pin(20) and remove drill plate assembly(19) or fixed leaf(28). Remove all chips from drill plate or leaf, wipe clean, and set aside.

o. Unscrew locator pin(17) and return to storage container.

p. Pull drilled hinge detail off divergent segment seal backbone and deburr rivet holes.

q. To repeat procedure for other guide post, go to step h. To install drilled guide posts, go to step r.

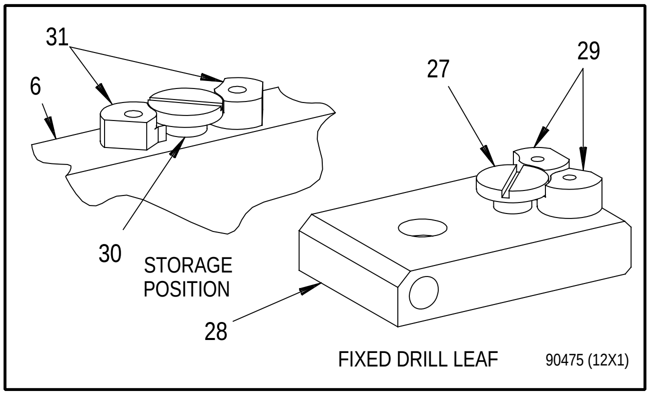


Figure 3. Augmentor Divergent Nozzle Seal Segment Guide Replacement (Sheet 6 of 7)

r. Loosen two knurled swivel head screws(13) and retract clamp bars(14).

s. Remove aft locator quick release pin(10) from end stop block(11).

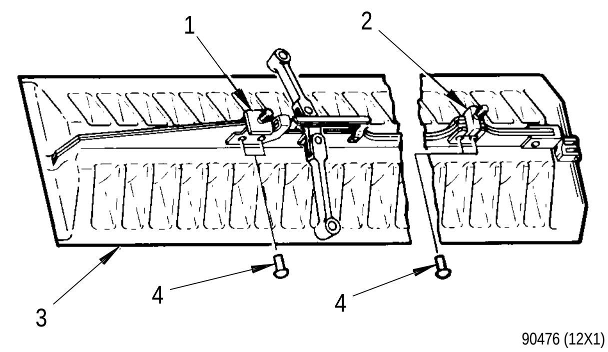
t. Slide divergent segment seal through base gusset(8).

u. Deburr all rivet holes. Remove all chips from fixture and wipe clean.

v. Install guide(1 or 2) on seal segment(3) as shown. Install rivets(4) with heads positioned as shown.

w. Flare rivets to secure. See figure 7. Refer to T.O. 2-1-111.

x. Return details and fixture to PWA 71028 storage container. Secure base inside container using clamps and wing nuts.



1. Augmentor divergent nozzle seal segment rear guide
2. Augmentor divergent nozzle seal segment forward guide
3. Augmentor divergent nozzle seal segment
4. Rivet
5. Aft divergent segment guide slider arm
6. Base
7. Base
8. Base gusset
9. Forward hinge support block
10. Aft locator quick release pin
11. End stop block
12. Aft hinge support block
13. Swivel head screw
14. Clamp bar
15. Gage point tooling ball
16. Backbone tooling ball
17. Locator pin
18. Half turn screw
19. Drill plate assembly
20. Quick release pin
21. Adjustable leaf
22. Rest button
23. Half turn screw
24. Socket head cap screw
25. Adjustable drill plate
26. Gage pin assembly
27. Lock screw
28. Fixed leaf
29. Bushings in fixed leaf
30. Lock screw
31. Bushings in base

Figure 3. Augmentor Divergent Nozzle Seal Segment Guide Replacement (Sheet 7 of 7)

8. AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - EDGE KINK/ DISTORTION STRAIGHTENING.

a. Ultrasonic clean for 30 minutes in perchlorethylene (PMC 9015) per SPOP 3 in T.O. 2-1-111 except omit oil dip. Throughly drain.

b. Bake at 300° to 350°F (149° to 177°C) for 30 minutes.

c. Wipe anvil clean with perchlorethylene (PMC 9015) prior to straightening.

d. Cold work kinks to original contour within serviceable height limit using anvil and rawhide mallet. Vary standoff between anvil and seal edge to allow for spring back.

e. Fluorescent penetrant inspect affected areas for cracks only per SPOP 70 in T.O. 2-1-111. None allowed. Repair per paragraph 3.

f. Warpage to be straightened by paragraph 11 or 13 as required.

9. AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - TRAILING EDGE SEPARATION REPAIR.

a. Using anvil and rawhide mallet, cold work separation to original contour within serviceable limits. Vary standoff between anvil and seal edge to allow for spring back.

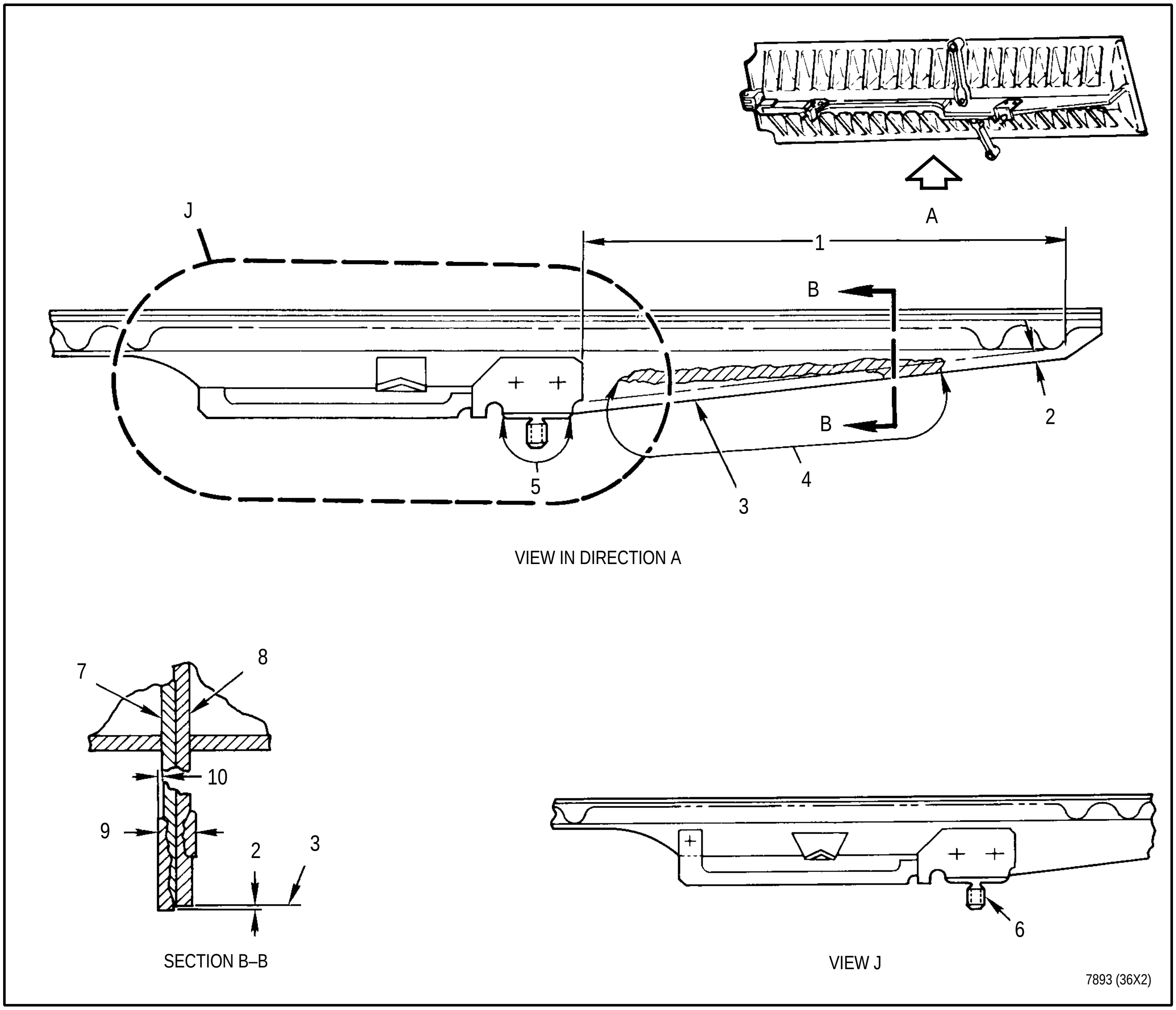
b. Fluorescent penetrant inspect repair area per SPOP 70 in T.O. 2-1-111 for cracks only. Cracks exceeding serviceable limits are not reparable.

10. AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY STIFFENER (AFT OF AFT GUIDE POST) - WEAR REPAIR. (See Figure 4.)

a. Two methods are available for repair of wear aft of aft guide post.

(1) Plasma spraying: applies only when thickness of reparable material exceeds 0.021 inch.

(2) Puddle welding: applies to all thicknesses of reparable material.



1. Segment of stiffener acceptable for repair
2. Maximum 0.010 inch
3. Surface
4. Area of stiffener to be repaired
5. No coating
6. Aft guide post
7. Stiffener
8. Stiffener
9. 0.030 to 0.036 inch
10. Maximum 0.010 inch, both sides

Figure 4. Augmentor Divergent Nozzle Seal Segment Assembly, Stiffener (Aft of Aft Guide Post) - Wear Repair

b. Plasma spray reparable stiffeners as follows:

(1) Grit blast area(s)(4) to be repaired using No. 120 to 150 aluminum oxide grit. Refer to T.O. 2-1-111.

NOTE

- Surrounding areas optional and may be incomplete.
- No coating permitted on surfaces of guide(6).

(2) Plasma spray prepared area(s) per PWA 53-47 in T.O. 2J-F100-53-1, WP 096 00. Thickness after coating shall be 0.032 to 0.046 inch.

(3) As required, grind area(s)(4) to obtain Dimensions(2, 10, and 9). Blend coating to adjacent surfaces.

(4) Apply antigalling compound per paragraph 19.

c. Puddle weld reparable stiffeners as follows:

(1) Remove surface oxides from area(s)(4) to be repaired.

(2) Using AMS 5832 filler metal, manually gas tungsten arc weld (puddle) worn area(s) per T.O. 2J-F100-53-1, SWP 093 01. Allow for cool down between weld passes. Use chills to prevent warpage.

(3) Grind area(s)(4) to obtain Dimensions(2, 10, and 9).

(4) Apply antigalling compound per paragraph 19.

11. AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY, STIFFENER (FORWARD OF AFT GUIDE POST) - WEAR, CRACK, TEAR, AND MISSING MATERIAL REPAIR.
(See Figures 5 and 6.)

a. Three methods are available for repair of stiffener forward of aft guide post.

(1) Plasma spraying: applies only to wear area thicknesses of stiffener exceeding 0.021 inch.

(2) Puddle welding: applies to all wear area thicknesses of stiffener, and all areas of stiffener with cracks or tears less than 0.250 inch long.

(3) Patching: applies to all wear area thicknesses of stiffener; and all cracks, tears, and missing material in Zone F.

b. Plasma spray reparable stiffeners as follows:

(1) Remove rivet(1, figure 5) securing brace(10) to seal segment by drilling or grinding. Remove brace(10) and guide(5).

(2) Grit blast area(4) to be repaired using No. 120 to 150 aluminum oxide grit. Refer to T.O. 2-1-111.

NOTE

- Surrounding areas optional and may be incomplete.
- No coating permitted on surfaces of guide(6).

(3) Plasma spray prepared area(4). Refer to PWA 53-47 in T.O. 2J-F100-53-1, WP 096 00. Thickness after coating shall be 0.032 to 0.046 inch.

(4) As required, grind area(4) to obtain Dimensions(7, 8, and 9). Blend coating to adjacent surfaces.

(5) Apply antigalling compound per paragraph 19.

(6) Install guide(5). Guide shall slide freely through distance(2) when part is loaded in direction(11).

(7) Install brace(10) and rivet(1). Minimum edge distance waived. Refer to T.O. 2-1-111.

c. Puddle weld reparable stiffeners as follows:

(1) Remove rivet(1, figure 5) securing brace(10) to seal segment by drilling or grinding. Remove brace(10) and guide(5).

(2) Remove surface oxides from area(4) to be repaired.

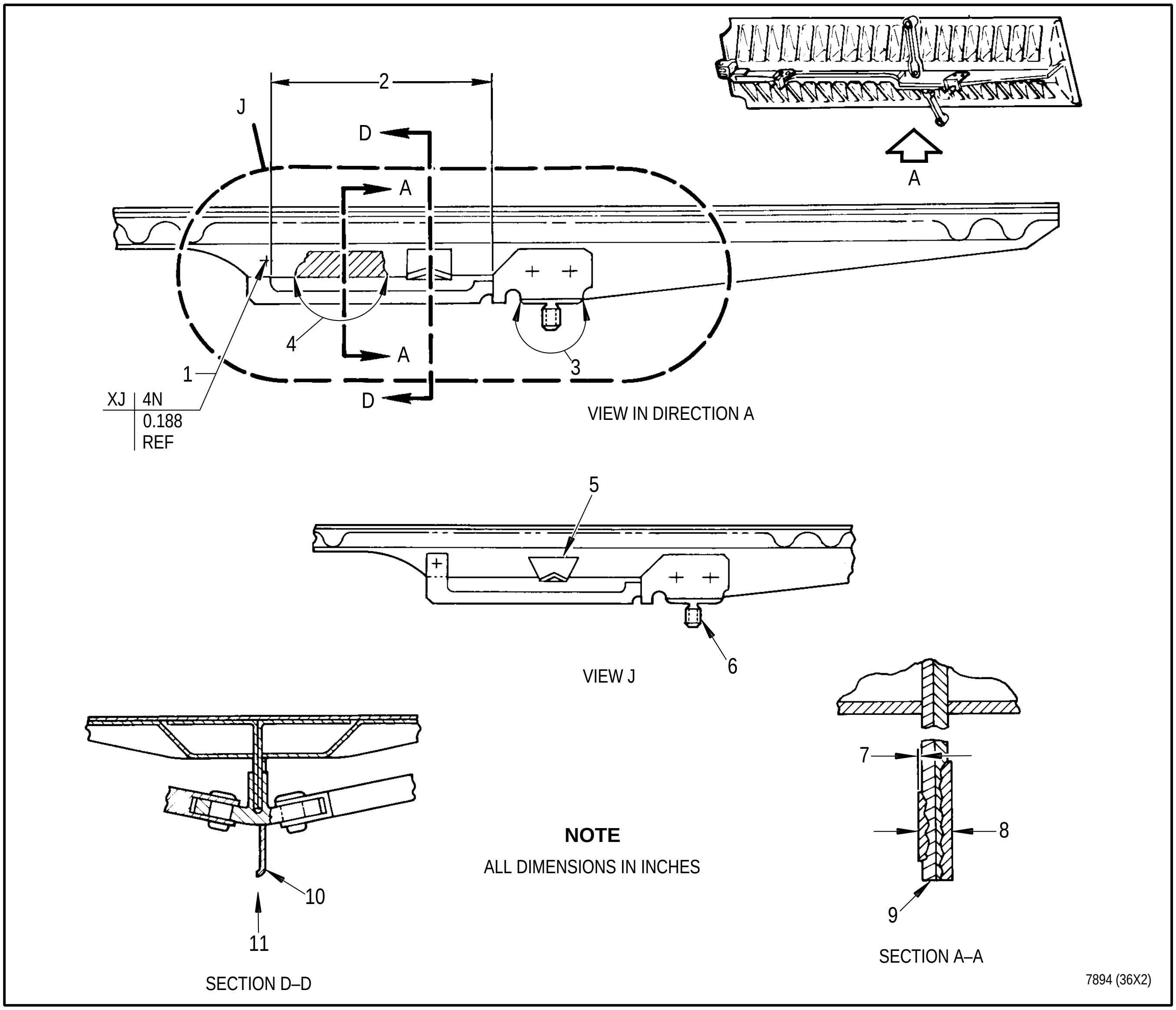


Figure 5. Augmentor Divergent Nozzle Seal Segment Assembly, Stiffener (Forward of Aft Guide Post) - Wear and Missing Material Repair

Legend for figure 5

1. Rivet
2. Segment of stiffener acceptable for repair
3. No coating
4. Area of stiffener to be repaired
5. Guide (slider)
6. Aft guide post
7. Maximum 0.008 inch, both sides, plasma spray only
8. 0.030 to 0.036 inch
9. Plasma coating shall be blended to adjacent surfaces. Welded surface edge shall not vary more than 0.020 inch.
10. Brace
11. Guide loaded in this direction

(3) Using AMS 5832 filler metal, manually gas tungsten arc weld (puddle) worn area per T.O. 2J-F100-53-1, SWP 093 01. Allow for cool down between weld passes. Use chills to prevent warpage.

(4) Grind area(4) to obtain Dimension(8). Blend edge(9) within 0.020 inch from unrepaired surfaces.

(5) Apply antigalling compound per paragraph 19.

(6) Install guide(5). Guide shall slide freely through distance(2) when part is loaded in direction(11).

(7) Install brace(10) and rivet(1). Minimum edge distance waived. Refer to T.O. 2-1-111.

d. Patch reparable stiffeners as follows:

(1) Remove rivet(1, figure 6) securing brace(3) to seal segment by drilling or grinding. Remove brace(3) and guide(12).

(2) Locally clean slider stiffener area with perchlorethylene (PMC 9015).

(3) Machine or grind per View M to remove stiffener section.

(4) Ultrasonic clean for 30 minutes minimum with perchlorethylene (PMC 9015) per SPOP 3 in T.O. 2-1-111, except omit oil dip. Drain thoroughly.

(5) Bake at 300° to 350°F (149° to 177°C) for 30 minutes minimum.

(6) Solution heat treatment of seal is permissible to enhance weldability per T.O. 2J-F100-53-1, SWP 095 01 (Cycle 101 or 102).

(7) Prepare new stiffener tab for welding as shown in View K.

(8) Wipe new tab, stiffener and clamps clean with perchlorethylene (PMC 9015).

Legend for figure 6

1. Rivet
2. Aft guide post
3. Brace
4. Guide loaded in this direction
5. 2.000 to 2.015 inches
6. Stiffener tab - AMS 5596 (INCO 718) 0.032 to 0.036 inch thick
7. 0.250 to 0.260 inch
8. 0.300 to 0.325 inch
9. 2.025 to 2.040 inches
10. 0.265 to 0.275 inch
11. Guide (slider) travel distance
12. Guide (slider)
13. Stiffener tab
14. Stiffener
15. Stiffener

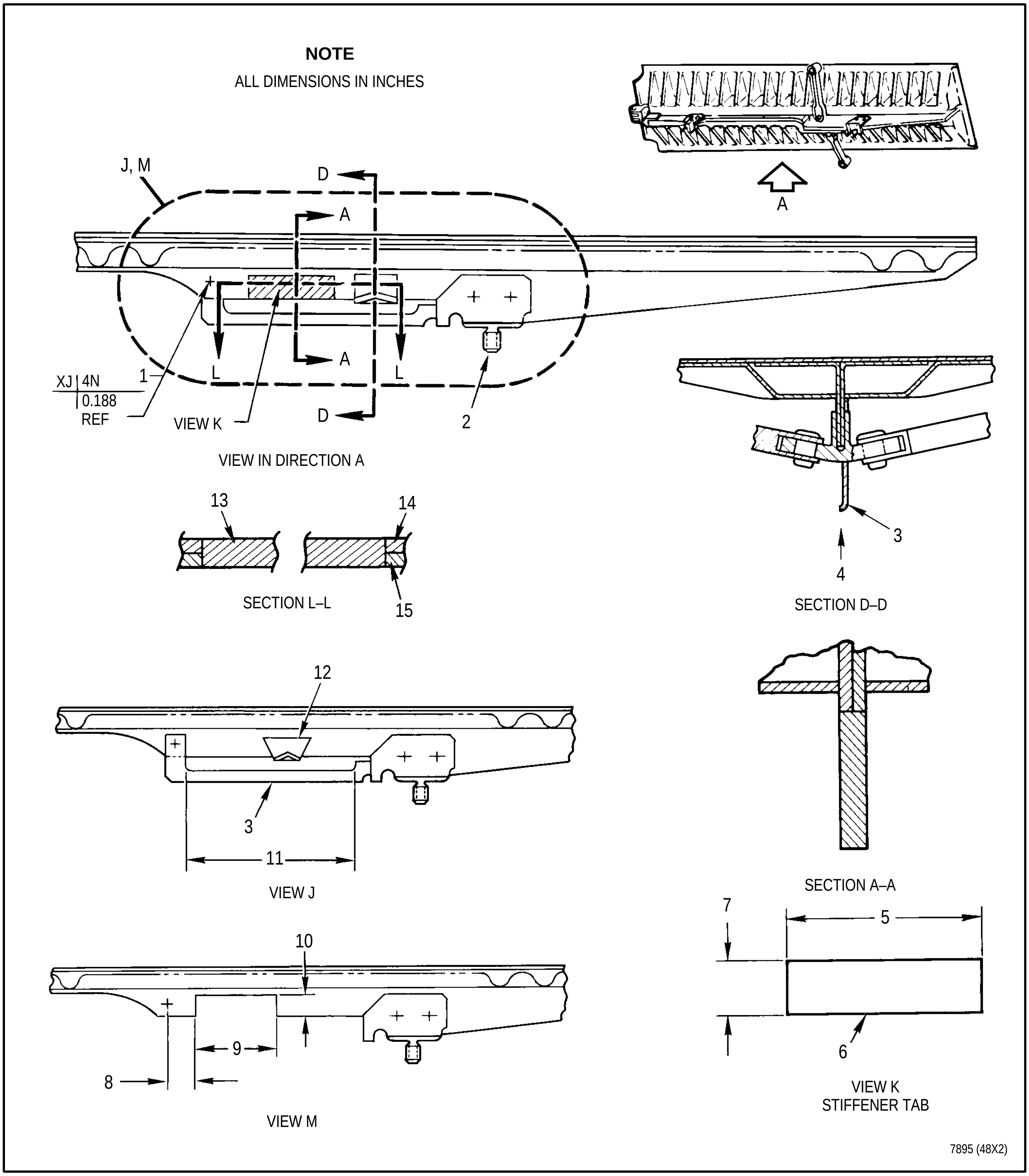


Figure 6. Augmentor Divergent Nozzle Seal Segment Assembly, Stiffener (Forward of Aft Guide Post) - Wear, Crack, Tear, and Missing Material Repair

(9) Clamp axially warped seals straight prior to welding. Clamp repair tab in place and tack weld in four places. Parent material of stiffener is AMS 5544 and repair tab is AMS 5596. Weld in repair tab using AMS 5832 weld wire.

(10) Fluorescent penetrant inspect stiffener weld areas for cracks only per T.O. 2-1-111 (SPOP 70). No cracks allowed.

(11) Ultrasonic clean in perchlorethylene (PMC 9015) for 30 minutes. Thoroughly drain.

(12) Bake at 300° to 350°F (140° to 177°C) for 30 minutes minimum. Cover part after cleaning to ensure cleanliness.

(13) Place part on a flat (within 0.100 inch) egg crate spider, or equivalent, with seal flat side down. Weights (graphite or 300 series stainless steel bars) placed on divergent seal corrugations to assure straightening are optional and are not to exceed 15 pounds total weight.

(14) Solution heat treat per T.O. 2J-F100-53-1, SWP 095 01 (Cycle 101 or 102), except time to be 2 hours.

(15) Inspect for serviceable straightness. Cold straighten part as required.

(16) Stabilization heat treat per Cycle 103. Precipitation heat treat (Cycle 12A) per T.O. 2J-F100-53-1, SWP 095 01. Permissible to omit stepped heat-up.

(17) Radiographic inspect welds per T.O. 33B-1-1 and SXRS-33.

(18) Grind all welds flush to 0.002 inch above with smooth transition. Maintain 0.030 inch minimum wall thickness. Refer to T.O. 2J-F100-53-1, SWP 091 02 (SPOP 533).

(19) Install guide(12). Guide shall slide freely through distance(11) when part is loaded in direction(4).

(20) Install brace(3) and rivet(1). Reset all rivets per T.O. 2-1-111.

(21) Apply antigalling compound per paragraph 19.

12. AUGMENTOR DIVERGENT NOZZLE SEGMENT SEAL ASSEMBLY, STIFFENER - RIVET HOLE ELONGATION REPAIR.
(See figure 7.)

a. Repair elongated rivet hole which attaches brace(1) to seal stiffener(2) per following procedure.

(1) Remove rivet(3) securing brace to seal assembly(4) by drilling or grinding. Remove brace(1) if still installed.

(2) Solution heat treat seal to enhance weldability. Refer to T.O. 2J-F100-53-1, SWP 095 01, (Cycle 101 or 102).

(3) Remove surface oxides from area surrounding rivet hole without thinning surrounding parent material.

(4) Manual Tungsten inert gas puddle weld worn areas using AMS 5832 weldwire. Refer to T.O. 2J-F100-53-1, SWP 093 01.

(5) Blend down weld as required, to get seal stiffener(2) thickness down to dimension(5).

(6) Solution heat treat seal assembly, except time to be 2 hours. Refer to Cycle 101 or 102. Also, stabilization heat treat per Cycle 103 and precipitation heat treat. Refer to Cycle 12A in T.O. 2J-F100-53-1, SWP 095 01. Permissible to omit stepped heat-up.

(7) Fluorescent penetrant inspect welded area. Refer to T.O. 2J-F100-9. No cracks allowed. Permissible to reweld cracks.

NOTE

- Dimple shall not reach into manufactured notch in aft guide.
- Bottom edge of brace should not interfere with seal stiffener welds.

(8) Install brace(1) into aft guide(6) by pushing on or tapping forward end of brace until dimple in brace is fully engaged with aft guide. Adjust brace position as required per dimension(2). Mark location for rivet hole in seal stiffener(2) using existing hole in brace and dimensions(8 and 11).

(9) Move brace(1) out of position and using a No. 40 or 41 drill, redrill rivet hole(10) per above guidelines.

(10) Deburr hole.

(11) Install assembled slider(9).

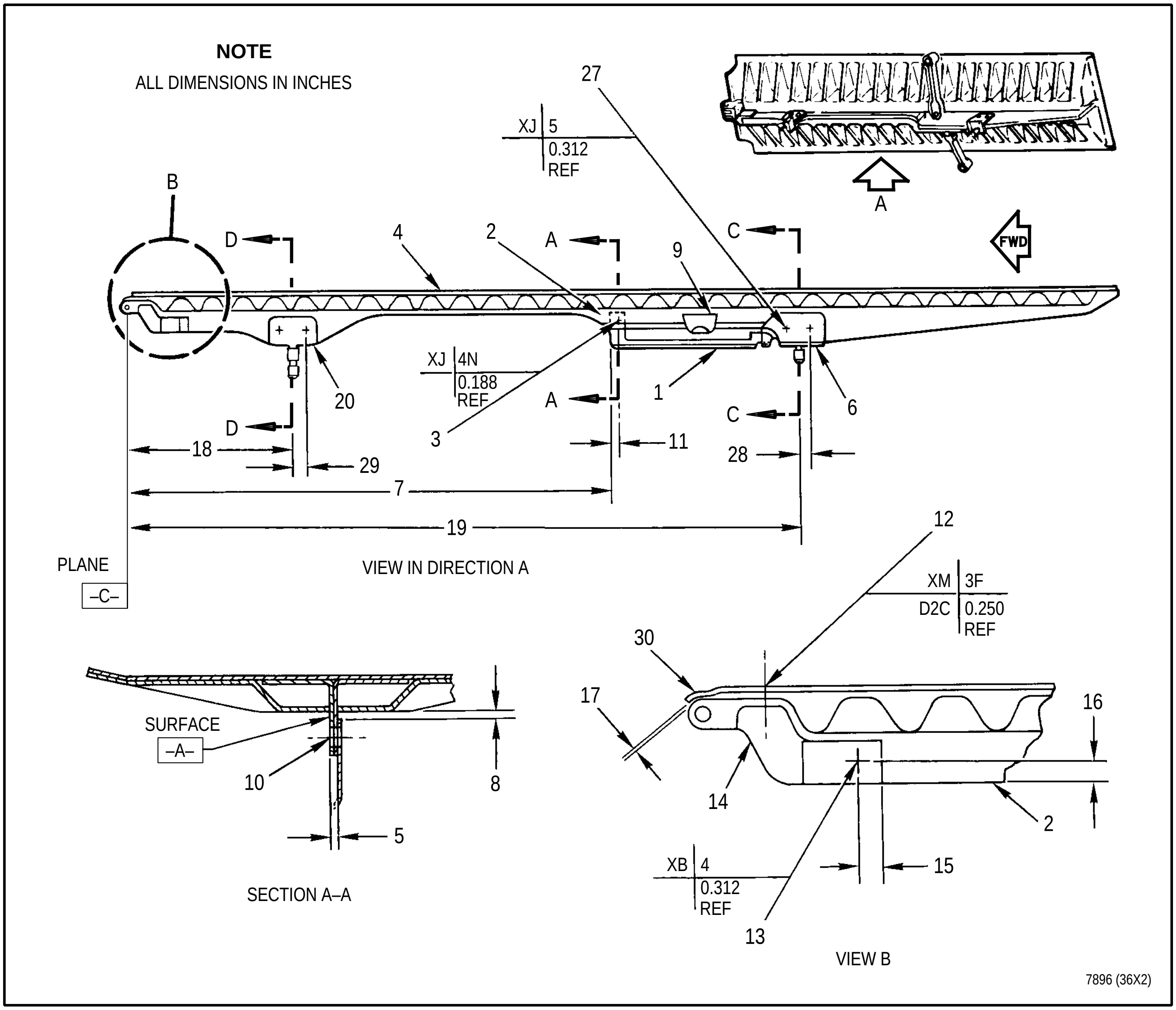
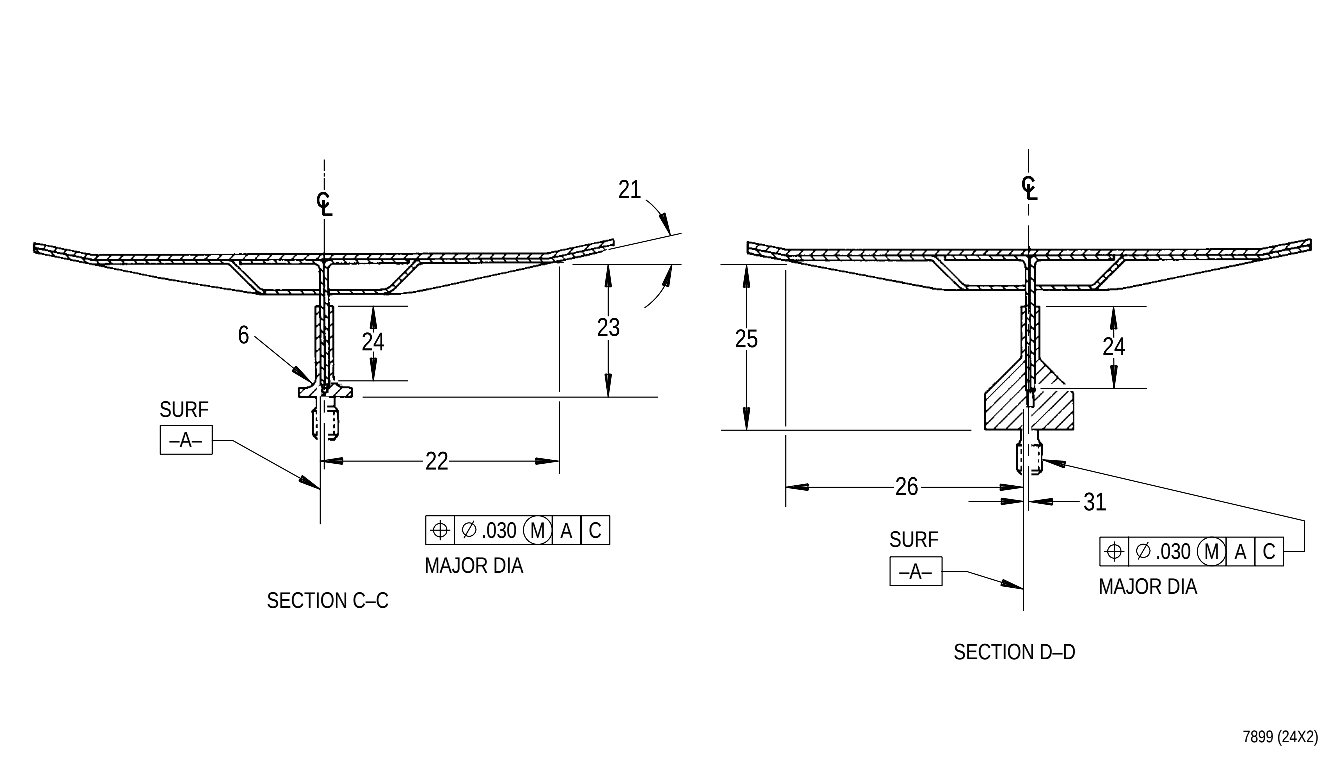


Figure 7. Augmentor Divergent Nozzle Segment Seal Assembly, Stiffener - Rivet Hole Elongation Repair (Sheet 1 of 2)



1. PN 4076458 brace
2. Seal stiffener
3. PN ST1219-102 rivet
4. Seal assembly
5. 0.030 to 0.036 inch
6. PN 4057748 aft guide
7. 10.045 to 10.075 inch
8. 0.040 to 0.060 inch
9. PN 4050490 slider (reference)
10. 0.096 to 0.100 inch through
11. existing hole in brace 0.150 inch reference
12. PN AN123619 rivet (2 places)
13. PN AN123336 rivet
14. PN 4036748 forward hinge
15. 0.200 inch
16. 0.160 inch
17. 0.015 inch maximum
18. 3.500 inch
19. 14.000 inch
20. PN 4057221 forward guide
21. 11° 15′ ±0° 45′ reference
22. 2.002 inch
23. 1.045 to 1.075 inch
24. Center rivets on this overlap
25. 1.295 to 1.325 inch
26. 1.869 inch PN ST1219-156 rivet, 4
27. places, as required, centered in item 24
28. 0.250 inch, typical (2 places)
29. 0.300 inch, typical (2 places)
30. Hinge cover
31. 0.017 inch

Figure 7. Augmentor Divergent Nozzle Segment Seal Assembly, Stiffener - Rivet Hole Elongation Repair (Sheet 2 of 2)

NOTE

Curled over portion of brace is to be positioned over seal stiffener.

(12) Reposition brace(1) and install rivet. Refer to T.O. 2-1-111. Minimum edge distance requirements are waived. Install with seal assembly(4) laying on a workbench with forward hinge(14) to operators right and with gaspath facesheet down. Brace(1) should go on side of seal stiffener(2) farthest away from operator. Manufactured head of rivet(3) may be on either side, but is preferred to be positioned on brace(1) side.

b. Repair elongated rivet hole attaching forward hinge(10) to seal stiffener per following procedure:

(1) Remove rivets(12 and 13) attaching forward hinge(14) to seal assembly(4). Remove forward hinge.

(2) Perform steps a.(2) through a.(7).

(3) Mount forward hinge(14) on seal assembly using temporary fasteners.

(4) Check gap between forward end of hinge and hinge cover(30) per dimension(17). Bend hinge cover as required in order to comply with this dimension.

(5) Mark location for rivet hole(13) using existing hole in hinge(14) or dimensions(15 and 16). If existing hole in hinge results in less than 0.070 inch stiffener rivet hole edge distance, bend hinge cover(30) or replace hinge in order to maintain this dimension.

(6) Remove forward hinge(14).

(7) Redrill rivet hole(13) per dimensions(15, 16, and 17) using a No. 30 drill.

(8) Deburr hole.

(9) Reinstall hinge(14) and install rivets(12 and 13). Refer to T.O. 2-1-111. Minimum edge distance requirements are waived. Manufactured head of rivets(12) shall go on gaspath facesheet side. Manufactured head of rivet(13) may go on either side of seal stiffener(2).

NOTE

- Following repair procedure applies to PN 4076459 augmentor divergent nozzle segment seal assembly.
- This repair procedure will also accomplish guide replacement without requiring guide being replaced to transfer rivet locations.

c. Repair elongated rivet holes attaching forward guide(20) and/ or aft guide(6) to seal stiffener(2) per following procedure:

(1) Remove rivets(27) attaching guides(20 and/or 6) requiring replacement to seal assembly(4) by drilling or grinding.

(2) Inspect rivet holes in removed guides. Replace guides if damaged or if guide rivet hole maximum diameter exceeds 0.132 inch. Retain guides for reuse if acceptable.

NOTE

Following procedure is optional.

(3) Solution heat treat of seal is permissible to enhance weldability per T.O. 2J-F100-53-1, SWP 095 01 (Cycle 101 or 102).

(4) Perform steps a.(3) through a.(7).

NOTE

Drawing No. X8319122 may be obtained from SAALC/MMEDD, Kelly AFB, TX 78241-5000.

(5) Install seal assembly(4) and guides(6 and 20) into X8319122 drill fixture. Thread guides into nuts provided and tighten with slots in line. Align edges with mounting pins and engage seal stiffener(2) with slots in guides. Insert alignment pin through forward hinge(14).

NOTE

If seal assembly(4) is warped resulting in less than 0.125 inch rivet hole minimum edge distance, assembly shall be recontoured before guide installation.

(6) Locate rivet holes(27) using existing holes in guides or dimensions(24, 28, and 29), as required.

(7) Redrill rivet holes previously puddle welded in seal stiffener(2) and guides, as required. Use a No. 30 drill.

(8) Remove seal assembly(4) and guides(6 and 20) from fixture. Deburr rivet holes in stiffener(2) and guides(6 and/or 20), as required.

(9) Assemble guides on seal assembly, as required.

NOTE

Rivets not requiring replacement should not be replaced in order to attain manufactured head orientation.

(10) Install rivets(27), as required. Refer to T.O. 2-1-111. Minimum edge distance and spacing requirements of T.O. 2-1-111 are waived. Manufactured head orientation of replaced rivets shall be per figure 4, Sheet 11 of 11.

13. AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - AXIAL WARPAGE STRAIGHTENING.

NOTE

- For seals with gaspath facesheet bowed inward.
- If backbone stiffener area is worn beyond serviceable limits, warpage straightening is accomplished in conjunction with paragraph 11.

a. Straighten edge kinks/distortion (if required) per paragraph 8.

b. Place part on a flat (within 0.100 inch) egg crate spider, or equivalent, with seal flat side down. Weights (graphite or 300 series strainless steel bars) placed on divergent seal corrugations to assure straightening are optional and are not to exceed 15 pounds total weight.

c. Solution heat treat per SPOP 761, cycle 101, or SPOP 762, cycle 102, in T.O. 2-1-111 except time to be 2 hours.

d. Inspect for serviceable straightness. Cold straighten part as required.

e. Stabilization heat treat per SPOP 763, cycle 103; Precipitation heat treat per SPOP 465, cycle 12A; Permissible to omit stepped heat-up. Refer to T.O. 2J-F100-53-1, SWP 095 01.

f. Reset all rivets per T.O. 2-1-111.

g. Fluorescent penetrant inspect for cracks only per SPOP 62 in T.O. 2-1-111. No cracks allowed.

h. Coat per paragraphs 14, 16, or 17 as required.

i. Apply antigalling compound per paragraph 19.

14. AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - NON GASPATH FACESHEET CONTACT WEAR REPAIR. (See Figure 8.)

a. Mask areas not receiving grit blast and coating.

CAUTION

Do not allow grit blast to dwell on base metal, causing rapid material removal. If thin Area(s) has collapsed causing hole during grit blast, replace part.

NOTE

- Handle cleaned surfaces with clean gloves before coating.
- Time interval between surface preparation and application of coating shall be as brief as practical (preferably within 2 hours) but in no case longer than 8 hours.

b. Grit blast using 120 to 150 grit.

c. Coat full length of seal area per PWA 53-5, 0.002 to 0.004 inch thick in Area B. Refer to T.O. 2-1-111.

NOTE

Following operation shall be accomplished immediately following step c.

d. Coat full length of seal area per PWA 53-5, 0.006 to 0.008 inch thick in Area C. Overspray permitted in Area D. Refer to T.O. 2-1-111.

e. Remove masking and residual masking adhesive.

f. Apply antigalling compound per paragraph 19.

15. AUGMENTOR DIVERGENT NOZZLE SEGMENT SEAL ASSEMBLY, GASPATH AND NONGASPATH FACESHEET - CRACK REPAIR.
(See figure 1.)

NOTE

Vendor repair procedure listed in QRSL must be kept current by incorporation of all T.O. changes that affect the repaired part. If the vendor procedure listed does not incorporate the T.O. changes, then the vendor must submit a Procedure/Revision to Pratt & Whitney for review and update the Procedure/Revision listed in the QRSL.

a. This repair is proprietary. Refer to T.O. 2J-F100-53-1, WP 606 00 for a listing of Qualified Repair Source List (QRSL).

For repair of Distress Modes:

JGDFGAJ -	Non-gaspath Zone A cracks
JGDFGAK -	Non-gaspath Zone B cracks
JGDFGAE -	Gaspath facesheet cracks
JGDFGAL -	Seal stiffener cracks

16. AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - THERMAL BARRIER COATING REPAIR.
(See figure 8.)

NOTE

- PWA 265 is preferred coating.
- Application of PWA 265 is source demonstration repair. Send parts to approved source for repair. Approved source list can be obtained by contacting USAF F100 Engineering Source Authority at address list in qualified repair source list (QRSL) located in T.O. 2J-F100-53-1, WP 600 00.
- Critical nature of this repair requires each facility intending to accomplish repair to contact USAF F100 Engineering Source Authority at address listed in QRSL to obtain information on becoming approved source.
- Plasma spray coating for USAF components shall be worked in accordance with approved depot process order or approved plasma spray plan per LPF-QPR-007. Approval shall be required by cognizant engineering office for specific engine component.

a. Mask areas not receiving grit blast and coating.

CAUTION

Do not allow grit blast to dwell on base metal, causing rapid material removal.

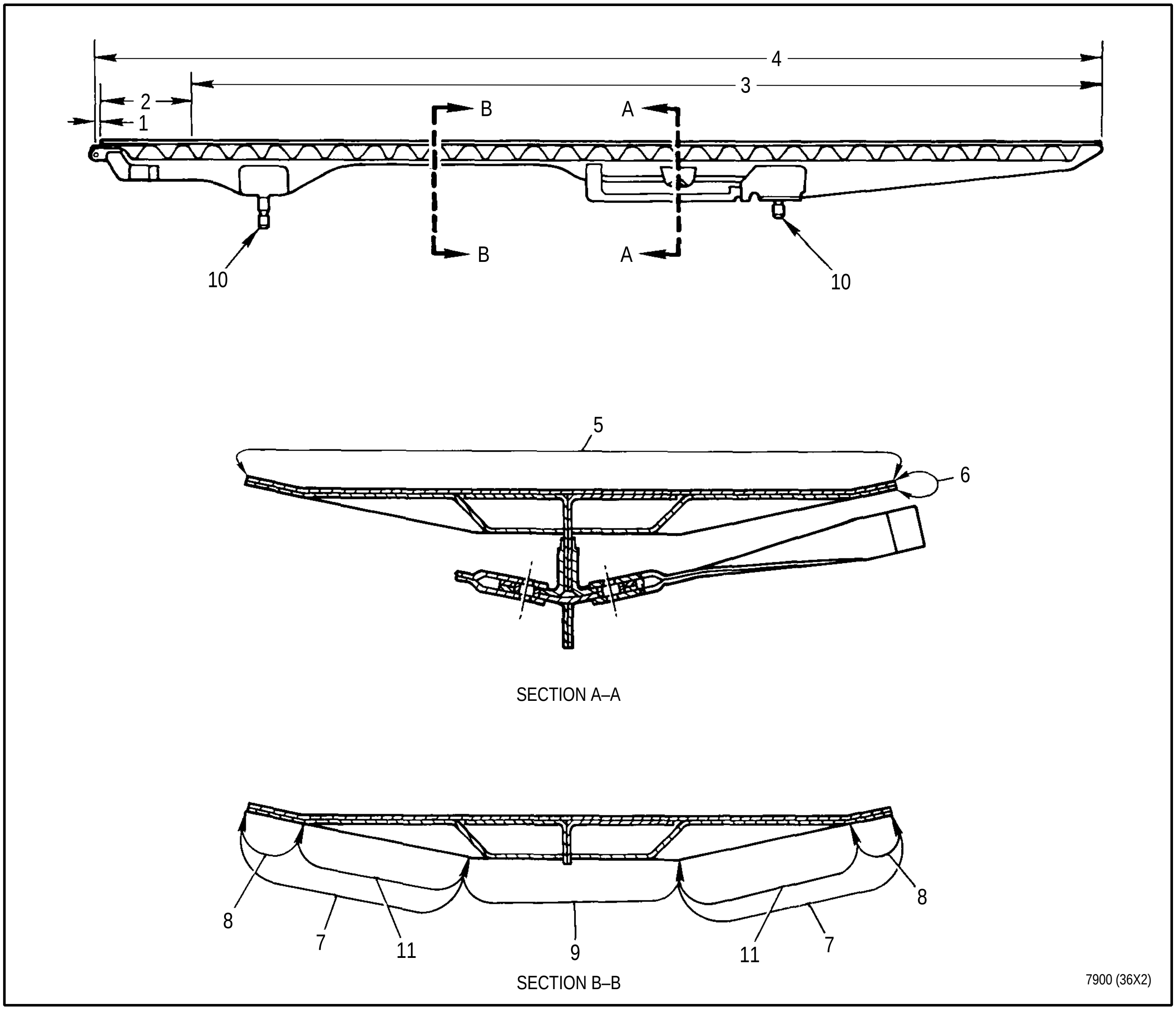
NOTE

- Handle cleaned surfaces with clean gloves before coating.
- Time interval between surface preparation and application of coating shall be as brief as practical (preferably within two hours), but in no case longer than eight hours.

b. Grit blast area to be coated. Refer to T.O. 2-1-111.

c. Coat full length of liner area per PWA 565, PWA 53-33, or SA-ALC 461/204 0.008 to 0.012 inch thick in Area A. Refer to T.O. 2-1-111.

d. Remove masking and residual masking adhesive.



1. 0.100 inch. No coating permitted.
2. Area V. Coating optional and may be incomplete.
3. Distance U, 18.600 inches.
4. 20.570 to 20.630 inches.
5. Area A, PWA 265, PWA 53-33, or SA-ALC 461/204 thermal barrier coating, for Distance U.
6. Coating optional and may be incomplete, both side edges.
7. Area B, PWA 53-5 hard coating.
8. Area C, PWA 53-5 hard coating 0.400 to 0.550 inch wide. Overspray in Area D permitted.
9. Coating optional and may be imcomplete, except coating not permitted on Surface T.
10. Sufrace T, no coating permitted.
11. Area D.

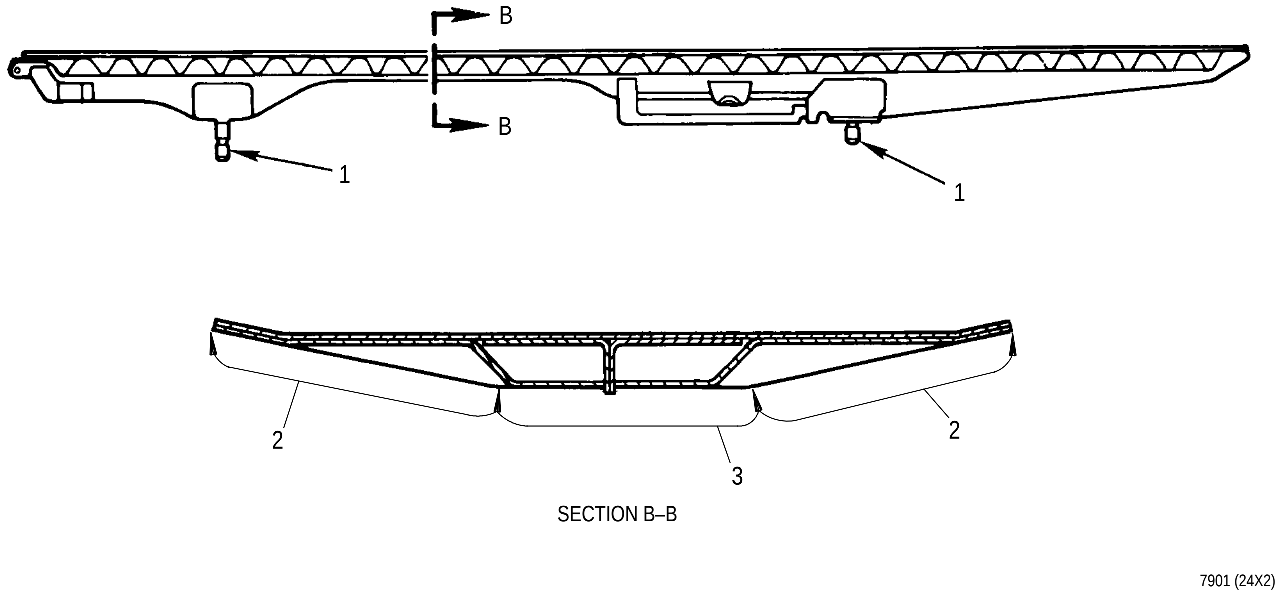
Figure 8. Augmentor Divergent Nozzle Seal Segment Assembly - Thermal Barrier Coating Repair and Wear Coating Repair

17. AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - PLASMA COATING REPLACEMENT.
(See Figure 9.)

a. Prepare areas shown in referenced figure per T.O. 2-1-111.

b. Plasma spray prepared area per PWA 53-5 per T.O. 2-1-111 to thickness of 0.002 to 0.004 inch. Surrounding areas optional and may be incomplete except no coating permitted on surfaces indicated in referenced figure.

c. Apply antigalling compound per paragraph 19.



1. Surface T. No PWA 53-5 coating permitted.
2. Apply plasma spray coating PWA 53-5. Refer to T.O. 2-1-111. Coat entire length to thickness of 0.002 to 0.004 inch.
3. Coating optional and may be incomplete except plasma spray coating PWA 53-5 not permitted on Surface T(1).

Figure 9. Augmentor Divergent Nozzle Seal Segment Assembly - Plasma Coating Replacement

18. AUGMENTOR DIVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - HINGE REPLACEMENT. (See figure 7 and Figures 10, 10A, and 10B.)

NOTE

Part numbers 4036410 and 4041274 seal assemblies are directly interchangeable, but details and subassemblies within seal assembly are interchangeable in sets only.

a. Remove unserviceable hinge(1, figure 10) by drilling and pushing out rivets(2).

b. Open PWA 71028 drill fixture storage container and loosen three screws securing fixture. Rotate three clamps so that fixture can be removed. Install two 0.625-11 lift eyes on base(6) at holes stamped LIFT HERE ONLY.

c. Using a hoist, lift fixture from storage container and place on clean flat work surface. Inspect for any missing details which may impair integrity of tool. Leave details in storage container until needed.

d. Fold aft divergent segment guide slider arms(5) either forward or aft to facilitate loading of divergent seal segment.

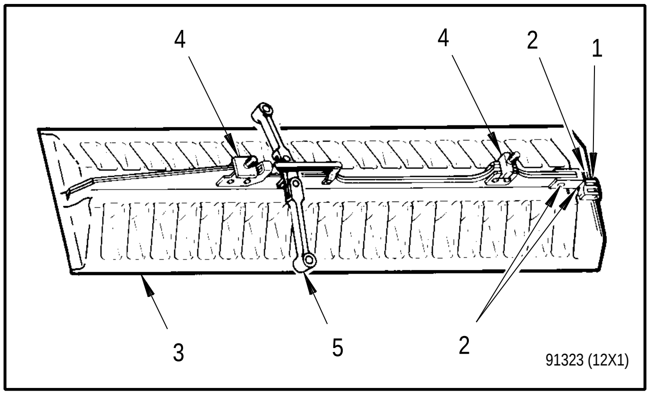


Figure 10. Augmentor Divergent Nozzle Seal Hinge Replacement (Sheet 1 of 6)

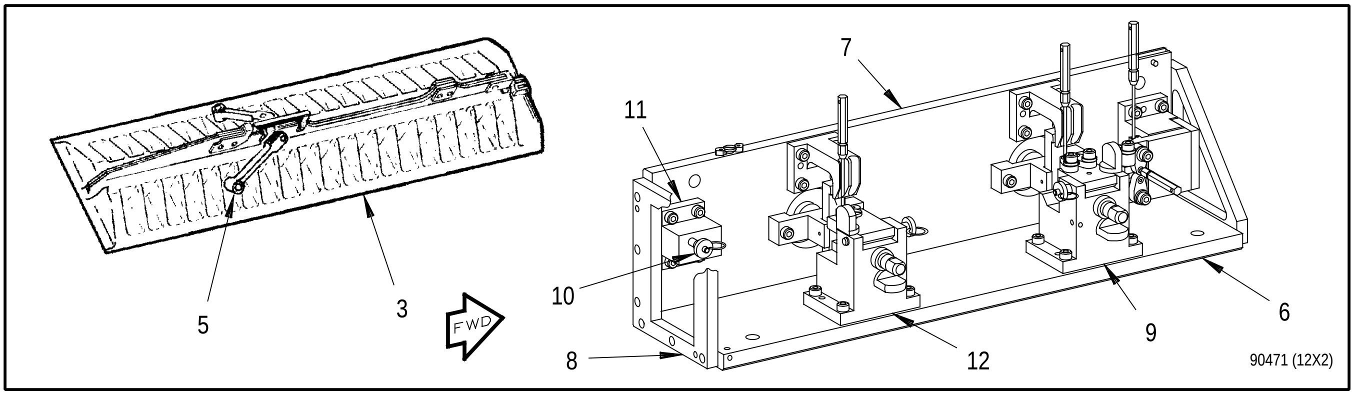


Figure 10. Augmentor Divergent Nozzle Seal Hinge Replacement (Sheet 2 of 6)

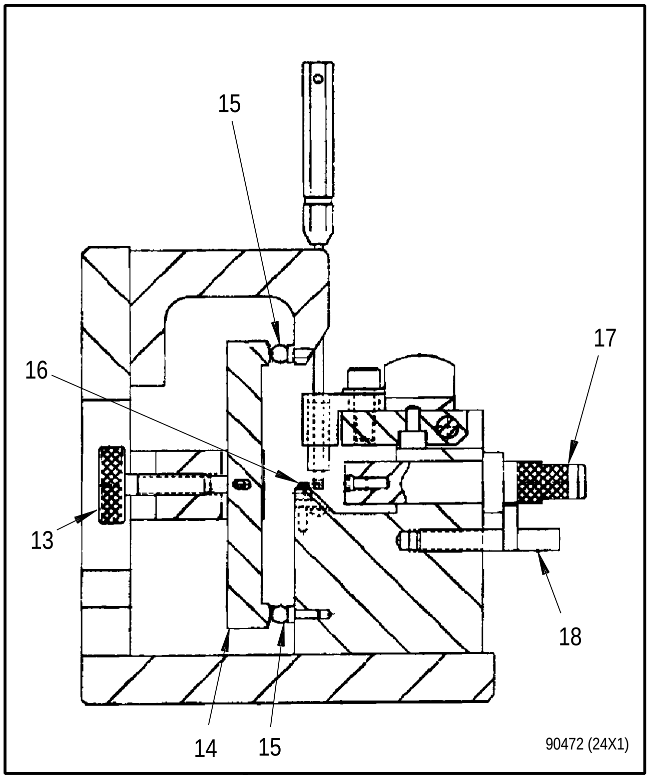


Figure 10. Augmentor Divergent Nozzle Seal Hinge Replacement (Sheet 3 of 6)

e. Install divergent segment seal, forward end first, through base gusset(8). Corrugated side should face away from base(7).

f. Slide segment toward forward hinge support block(9) until aft locator quick release pin(10) can be installed into end stop block(11). Slide segment back so aft edge contacts aft locator pin.

g. Adjust two swivel head screws(13) until clamp bar(14) positions segment gage points against four tooling balls(15). The segment backbone should also rest on two tooling balls(16).

NOTE

- Use adjustable drill plate (PWA 71028, item 3) if rivet holes exist in segment. Go to step h.
- Use fixed drill plate (PWA 71028, item 45) if no holes exist in segment (part has been weld repaired) or replacement hinge. Go to step i.

h. Install forward adjustable drill plate assembly(19) to replace hinge in segment with existing hole as follows:

(1) Install forward drill plate assembly(19) by locating slot(20) in clamp plate under socket head cap screw(21) and sliding assembly toward base(7) until locator surface contacts segment seal backbone.

(2) Secure assembly to hinge support block(22) by tightening socket head cap screw(21). This also will square drill plate assembly to segment seal(3).

(3) Loosen three socket head cap screws(23) in drill plate assembly(19) so adjustable bushings(24 and 25) are free to rotate.

(4) Use 0.098 inch diameter gage pin assembly(26) marked [C] to align two forward hinge adjustable bushings(24) with existing 3/32 inch diameter rivet holes.

(5) Secure each adjustable bushing(24) in place by tightening socket head cap screw(23). Continue to adjust bushing position until gage pin installs smoothly into rivet hole after bushing is secured in place.

(6) Use 0.1285 inch diameter gage pin assembly(27) marked [B] to align forward hinge adjustable bushing(25) with existing 3/16 inch diameter rivet holes.

(7) Secure adjustable bushing(25) in place by tightening socket head cap screw(23). Continue to adjust bushing until gage pin installs smoothly into rivet hole after bushing is secured in place.

(8) Loosen socket head cap screw(21). Remove forward adjustable drill plate assembly(19) and set aside.

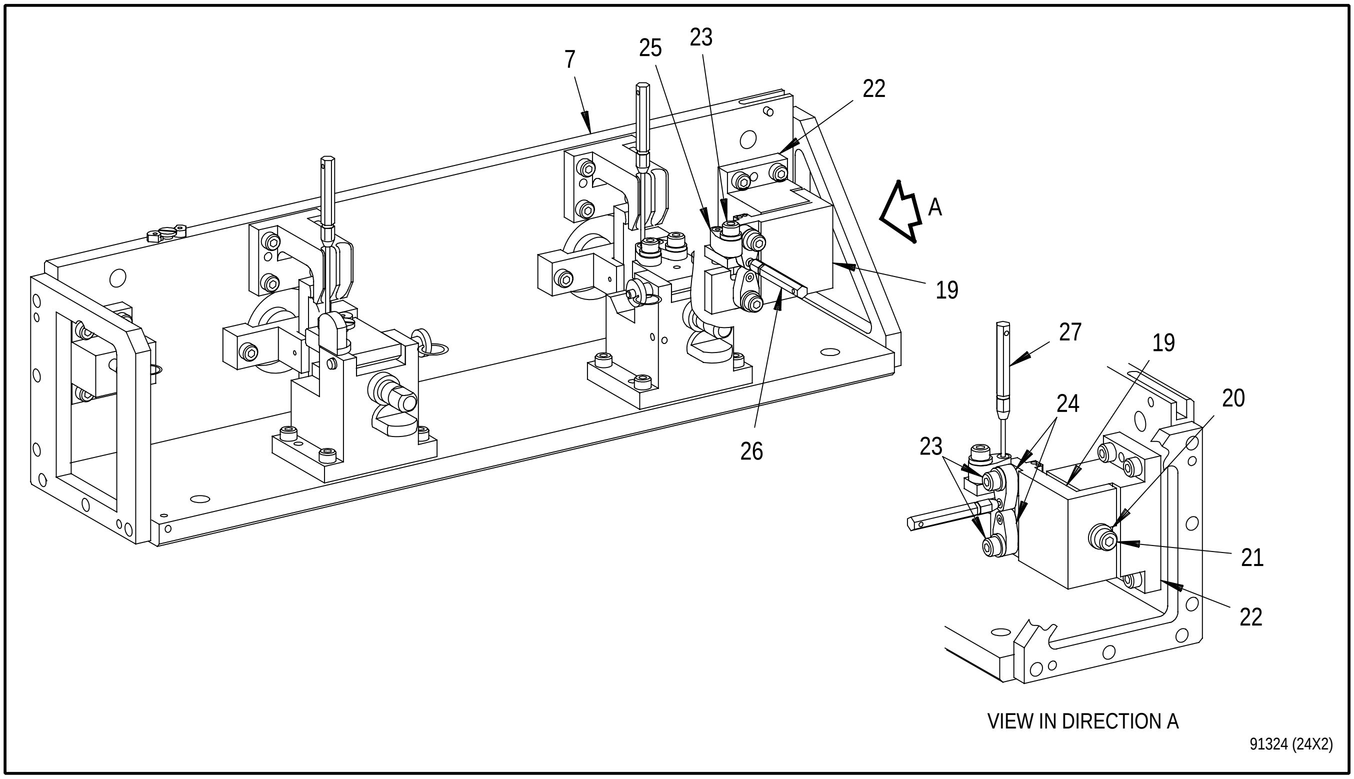


Figure 10. Augmentor Divergent Nozzle Seal Hinge Replacement (Sheet 4 of 6)

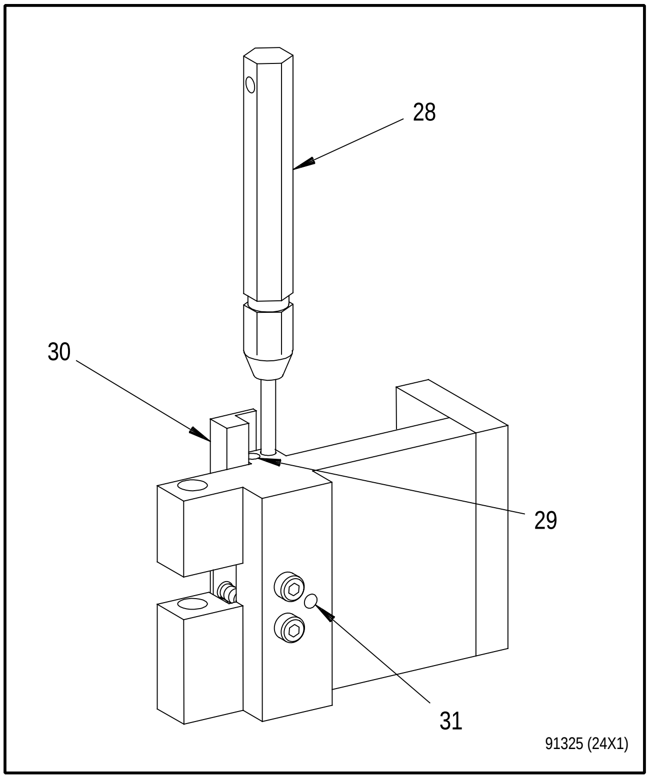


Figure 10. Augmentor Divergent Nozzle Seal Hinge Replacement (Sheet 5 of 6)

i. Using appropriate fixed or adjustable drill plate assembly, install replacement forward hinge (PN 4036748) as follows:

(1) Place forward hinge plate assembly on work bench with socket set screw pad clamp(31) side resting on bench.

(2) Position replacement hinge detail so hinge edge rests against hinge plate face, opposite socket set screw pad clamp(29).

(3) Install 0.125 inch diameter gage pin assembly(28), marked [A], through drill plate assembly and forward hinge 0.125 inch diameter holes.

(4) Adjust socket set screw pad clamp(29), located in hinge plate side face, until replacement hinge is snug against hinge plate locating face.

(5) Place forward hinge spacer(30) with flat face resting on segment seal. Align holes in spacer with existing holes in seal non-gaspath face.

(6) Using one finger to hold hinge against drill plate bottom face, install drill plate assembly by locating slot(20) in clamp plate under socket head cap screw(21) and sliding assembly toward base(7) until locator surface contacts segment seal backbone.

(7) Secure assembly to hinge support block(22) by tightening socket head cap screw(21). This also will square drill plate assembly to segment seal(3).

(8) Adjust socket set screw pad clamp(31) until forward hinge is flat against spacer.

j. Drill two rivet holes through both hinge and (if not previously drilled) divergent segment seal. Use cutting oil to prevent overheating of drill bit or local hardening of details. Use of carbide drill bits and slow drill press speed is recommended.

k. Loosen two socket set screw pad clamps(29 and 31) on forward hinge plate top and side faces.

l. Loosen socket head cap screw(21) and remove hinge and hinge plate assembly from hinge support block(22).

m. Remove the gage pin(28) marked [A].

n. Separate drilled forward hinge detail from drill plate assembly.

o. Remove all chips from drill plate assembly and wipe clean. Set drill plate aside.

p. Remove spacer(30), remove all chips, wipe clean, and return to storage container.

q. Place drilled forward hinge detail(32), tail end down, into slot in base(7) located on top face.

r. Secure hinge in place by tightening socket set screw pad clamp(33).

s. Countersink bottom face of two rivet holes in hinge, as shown in figure 10A, using a 100 degree countersink. Refer to T.O. 2-1-111.

t. Deburr holes and countersinks in hinge.

u. Loosen socket set screw pad clamp(33, figure 10) and remove hinge detail.

v. Loosen two knurled swivel head screws(13) and retract clamp bars(14).

w. Remove aft locator quick release pin(10) from end stop block(11).

x. Slide divergent segment seal through base gusset(8) and deburr all rivet holes.

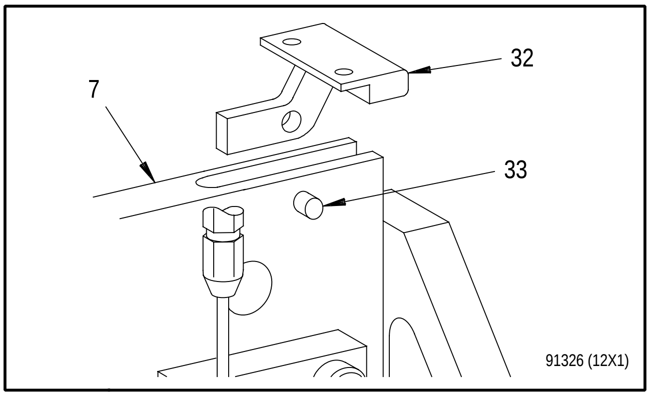


Figure 10. Augmentor Divergent Nozzle Seal Hinge Replacement (Sheet 6 of 6)

Legend for figure 10.

1. Unserviceable forward hinge
2. Rivet
3. Augmentor divergent nozzle seal segment
4. Augmentor divergent nozzle seal segment guide
5. Aft divergent nozzle seal segment guide slider arm
6. Base
7. Base
8. Base gusset
9. Forward hinge support block
10. Aft locator quick release pin
11. End stop block
12. Aft hinge support block
13. Swivel head screw
14. Clamp bar
15. Gage point tooling ball
16. Backbone tooling ball
17. Locator pin
18. Half turn screw
19. Forward drill plate assembly
20. Slot
21. Socket head cap screw
22. Hinge support block
23. Socket head cap screw
24. Adjustable bushing, 3/32 inch diameter hole
25. Adjustable bushing, 3/16 inch diameter hole
26. 0.098 inch diameter gage pin assembly marked [C]
27. 0.1285 inch diameter gage pin assembly marked [B]
28. 0.125 inch diameter gage pin assembly [A]
29. Socket set screw pad clamp
30. Forward hinge spacer
31. Socket set screw pad clamp
32. Forward hinge detail
33. Socket set screw pad clamp

y. Install hinge(1, figure 10B) on nongaspath side of divergent seal segment as follows:

(1) Install hinge(1) on seal assembly as shown using temporary fasteners.

(2) Measure separation(2) of replacement hinge from hinge cover(3) at leading edge of curled lip. If separation measures 0.015 inch or less, go to step y.(5). If separation exceeds 0.015 inch, go to step y.(3).

(3) Remove temporary fasteners attaching hinge to seal assembly.

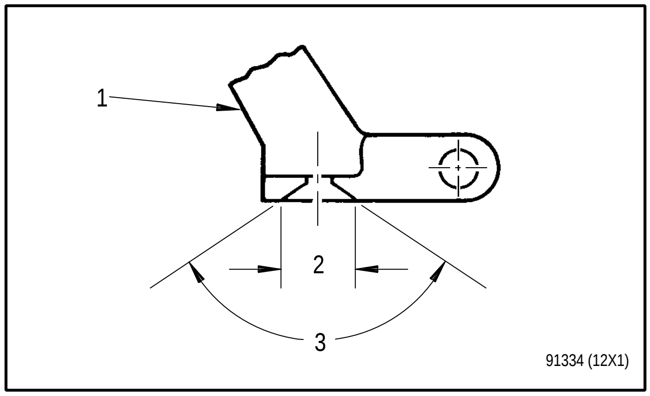
(4) Recontour hinge cover(3) to obtain a separation of 0.015 inch or less. Do not flatten out curled lip at leading edge of hinge cover. Go to step y.(1)

(5) Remove temporary fasteners attaching hinge to seal assembly. Fluorescent penetrant inspect for cracks only. Refer to T.O. 2-1-111, SPOP 70. No cracks allowed.

(6) Install rivets(4) in three locations, positioning heads as shown. See figure 7. Flare rivets to secure hinge. Refer to T.O. 2-1-111.

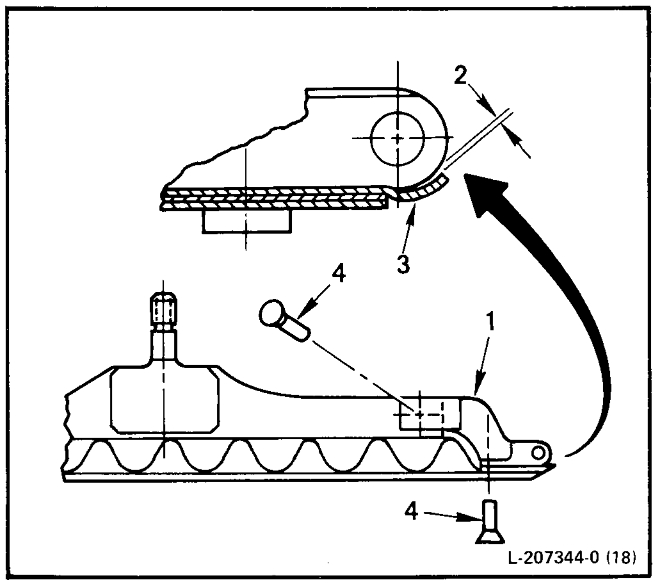
z. Remove all chips from fixture and wipe clean.

aa. Return details and fixture to PWA 71028 storage container. Secure base inside container using clamps and wing nuts.



1. Hinge, PN 4036748
2. 0.170 to 0.180 inch, 2 places
3. 100°, typical

Figure 10A. Augmentor Divergent Nozzle Seal Hinge Rivet Hole



1. Hinge
2. Separation
3. Hinge cover
4. Rivet

Figure 10B. Augmentor Divergent Nozzle Seal Hinge Separation

18. AUGMENTOR DIVERGENT NOZZLE SEGMENT SEAL - ANTIGALLING COMPOUND APPLICATION.
(See Figure 11.)

NOTE

Coating in areas other than those shown in figure 11 is optional and may be incomplete.

a. See figure 11 for areas to be coated.

b. Apply PWA 36545 antigalling compound to segment seal. Parent material is AMS 5544 nickel alloy.

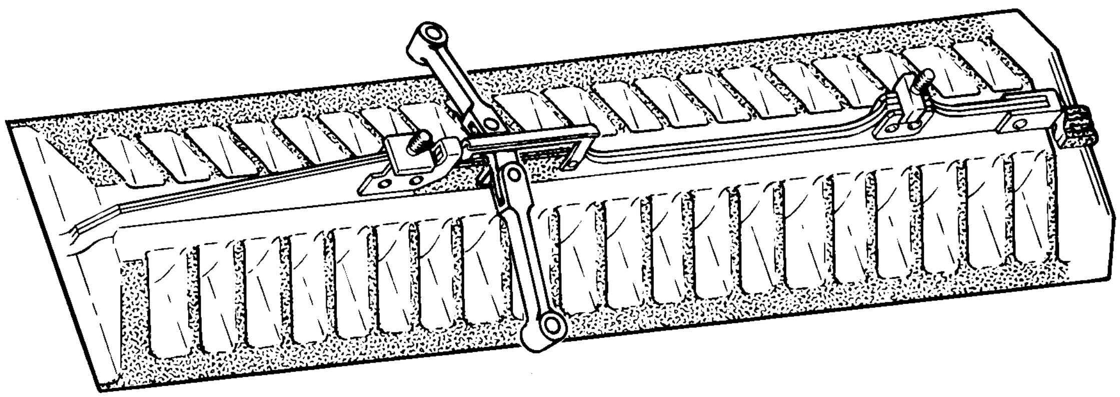


Figure 11. Augmentor Divergent Nozzle Segment Seal - Antigalling Compound Application

19. AUGMENTOR DIVERGENT NOZZLE SEGMENT SEAL - HINGE COVER REPLACEMENT

(See Figure 12.)

NOTE

For segment seals previously repaired by this method, go to step b.

a. For seals not previously repaired by this method, replace hinge cover as follows:

(1) Measure dimension(2) which is the forward edge of the gaspath side not including hinge cover(1).

(2) Remove hinge(9) by drilling and pushing out rivets.

(3) Cut off old hinge cover to dimension(2). Remove chip or burrs.

(4) Install hinge(9), riveting as shown in figure.

(5) Position hinge cover(1) to dimensions(3 and 5). Clamp securely.

(6) Locate rivet holes by dimensions(6 and 8). Drill using No. 40 drill. Remove clamp and burrs from parts.

(7) Assemble hinge cover(1), spacers(10) on seal and rivet as shown in figure.

b. For seals previously repaired by this method, replace hinge cover as follows:

(1) Remove old hinge cover(1) by drilling and pushing out rivets.

(2) Position new hinge cover(1) to dimensions(3 and 5). Clamp securely.

(3) Use No. 40 drill to transfer drill rivet holes from seal to hinge cover. Remove clamp; remove burrs from parts.

(4) Assemble hinge cover(1), spacer(10) on seal and rivet as shown.

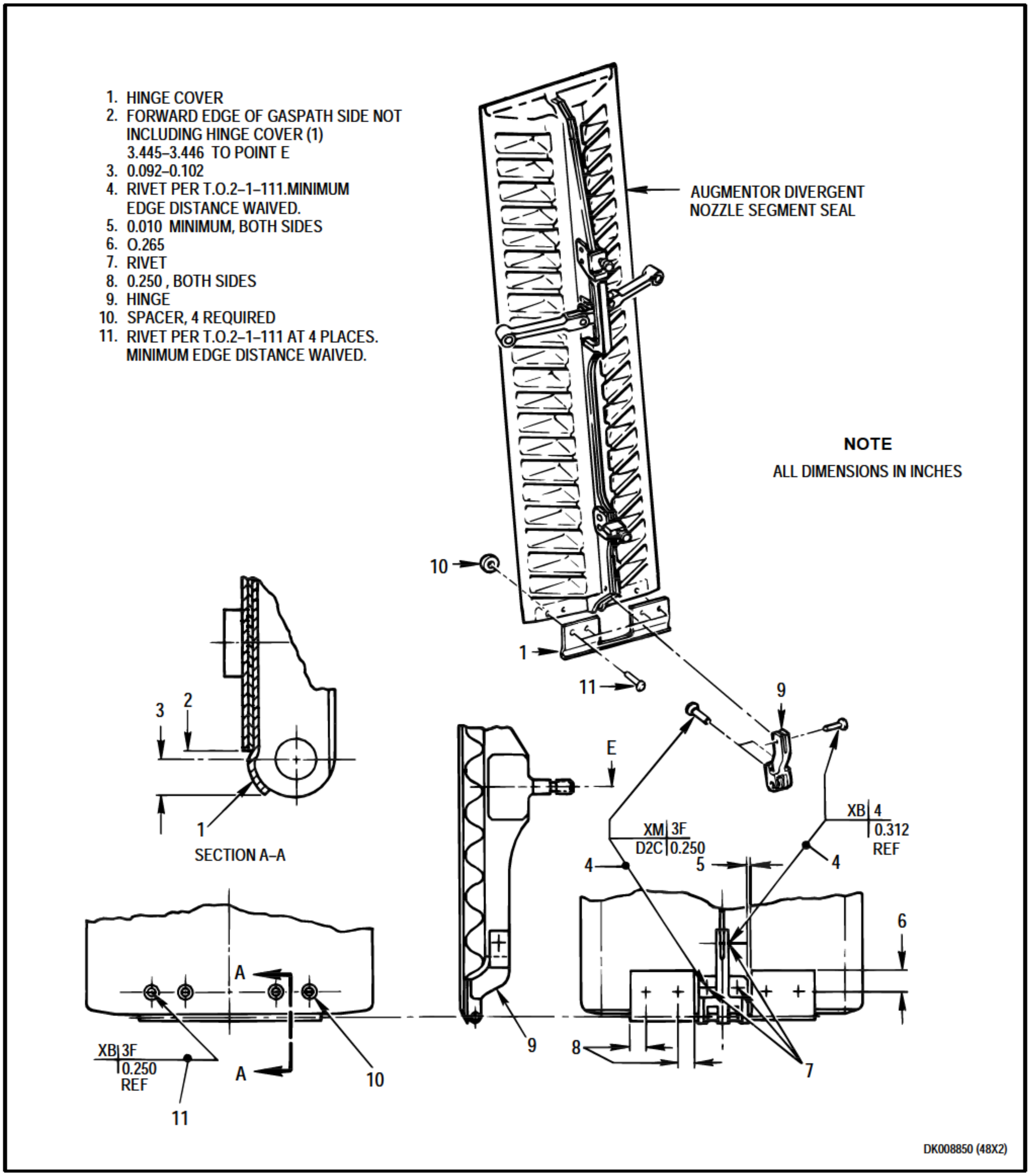


Figure 12. Augmentor Divergent Nozzle Segment Seal - Hinge Cover Replacement

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL ASSEMBLY, AUGMENTOR CONVERGENT NOZZLE SEGMENT -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 28

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2A	19	5 - 10	19	12D Blank Added	19
2B Blank Added	1	10A - 10B Added	19	13 - 17	19
3	9	11 - 12	19	18 - 19	0
4	0	12A - 12C Added	19	20 Blank	0

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Application of Antiseize Compound (PWA 36545)	SPOP 748

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ALCOHOL, ISOPROPYL	TT-I-735
COMPOUND, ANTIGALLING	ESNALUBE 382 (PWA 36545)
PLASMA COATING	PWA 256-1
PLASMA COATING	PWA 53-1

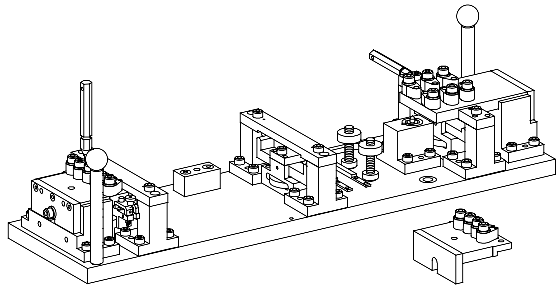
EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
RIVET	AN123319	AR
RIVET	AN123320 OR AN123336	AR
RIVET	AN123619	AR
SPACER	4034930 OR 4023967	AR

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
7	AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL ASSEMBLY - HINGE COVER REPLACEMENT	
	FIXTURE, DRILL, SEAL, AUGMENTOR CONVERGENT NOZZLE SEGMENT	PWA 71030
8	AUGMENTOR CONVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - AFT HINGE REPLACEMENT	
	FIXTURE, DRILL, SEAL, AUGMENTOR CONVERGENT NOZZLE SEGMENT	PWA 71030
8A	AUGMENTOR CONVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - FORWARD HINGE REPLACEMENT	
	FIXTURE, DRILL, SEAL, AUGMENTOR CONVERGENT NOZZLE SEGMENT	PWA 71030

ILLUSTRATED SUPPORT EQUIPMENT



PWA 71030 –C

Figure T1. PWA 71030 FIXTURE

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor convergent nozzle segment seal assembly.

2. Deleted.

3. Deleted.

Figure 2. Deleted.

4. AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL ASSEMBLY - AXIAL WARPAGE REPAIR.
(See figure 1.)

a. Repair axial warpage of more than 0.250 inch, but not greater than 0.500 inch measured along centerline of seal assembly.

b. Straighten by cold working to less than 0.125 inch bow.

c. Reinspect nongaspath side stiffener band, after straightening, for distortion and kinking.

5. Deleted.

Figure 3. Deleted.

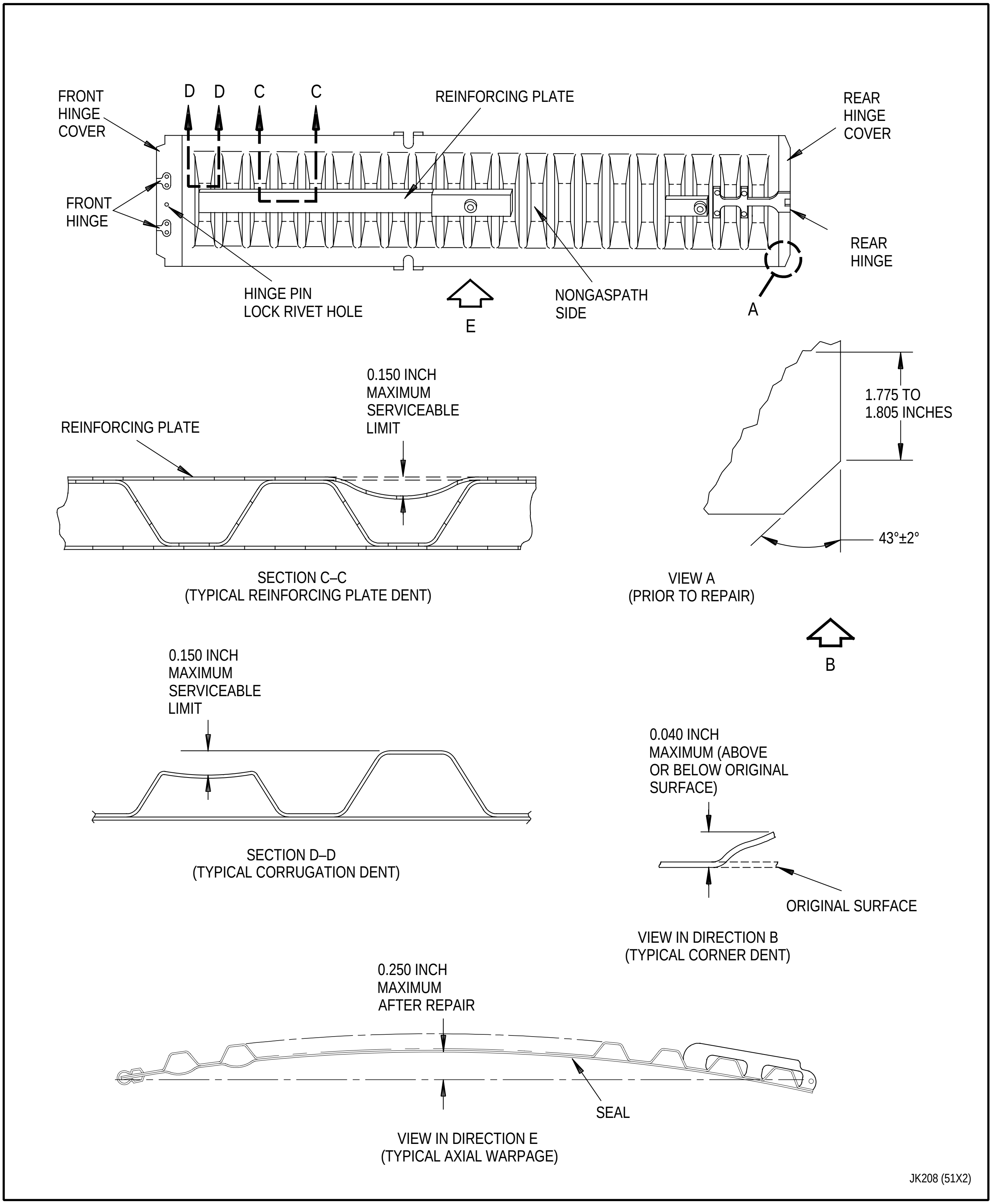
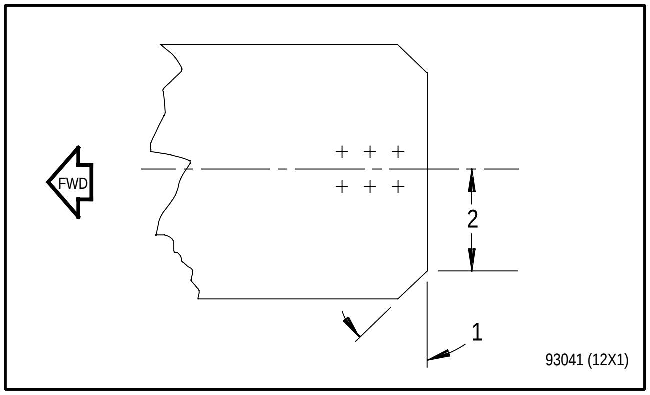


Figure 1. Augmentor Convergent Nozzle Segment Seal Assembly - Repair

6. AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL ASSEMBLY - REPAIR OF DAMAGED AFT END CORNERS.
(See Figure 4.)

a. Repair by removing corner material to dimensions shown in figure 4.



1. 40° to 46°, 2 places
2. 1.760 to 1.180 inches, 2 places, dimension after repair

Figure 4. Augmentor Convergent Nozzle Segment Seal Assembly - Repair of Damaged Aft End Corners

7. AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL ASSEMBLY - HINGE COVER REPLACEMENT.
(See Figures 4A and 5.)

a. Use PWA 71030 drill fixture for forward hinge cover replacement whether or not seals were previously repaired by this method.

(1) Prepare PWA 71030 drill fixture as follows:

(a) Place PWA 71030 on clean, flat surface and wipe fixture clean using isopropyl alcohol.

(b) Inspect fixture for any imperfections or missing details that may impair tool function.

(c) Remove two locator bars(1, figure 4A) and two locator plates(2) by unscrewing socket head cap screws(3), six places.

(d) Lower three clamp bars(4) by turning clamp knobs(5) counterclockwise(CCW).

(e) Remove two drill plate assemblies(6 and 21) by loosening or removing socket head cap screws(7 and 23). Remove third drill plate assembly stored on base.

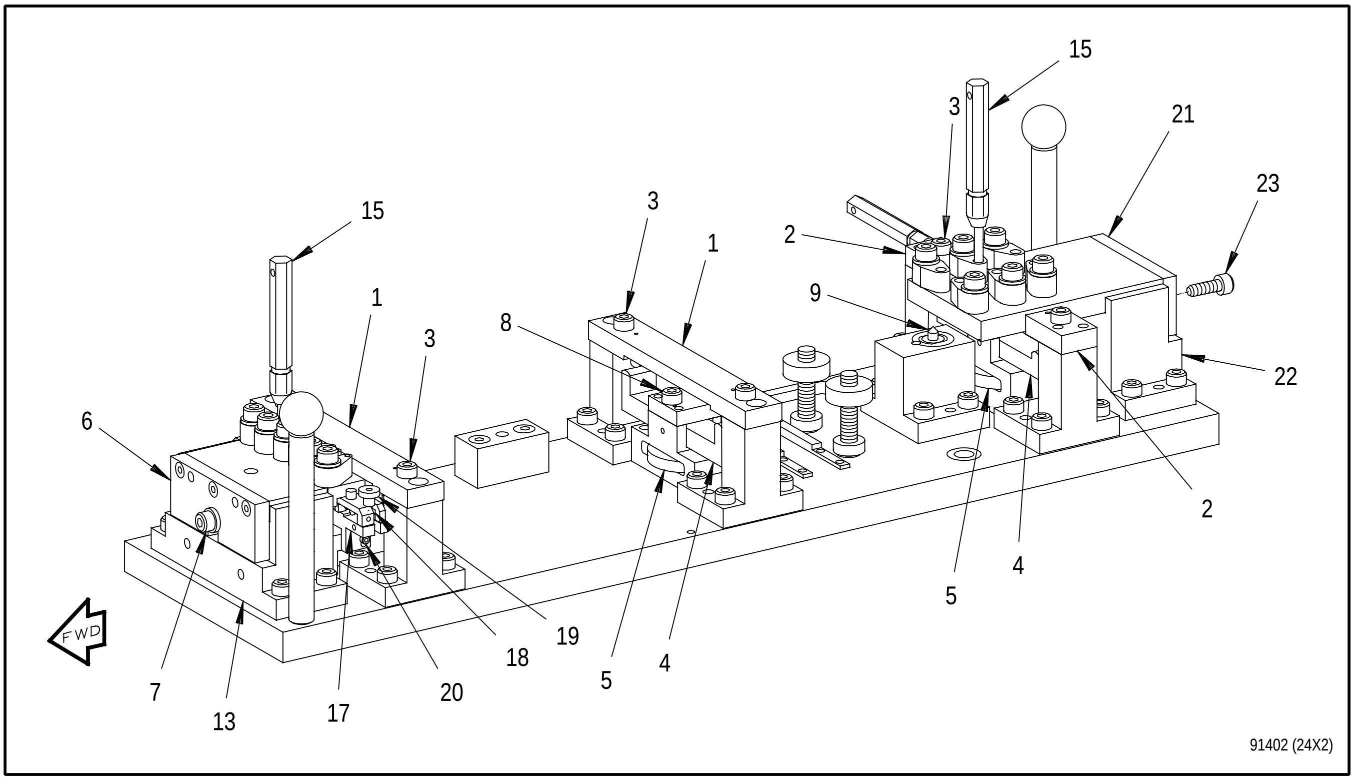


Figure 4A. Convergent Nozzle Segment Seal Hinge Cover - Replacement (Sheet 1 of 4)

b. Replace front hinge cover as follows:

(1) For seals not previously repaired by this method, accomplish the following:

NOTE

For segment seals previously repaired by this method, go to step b.(2).

(a) Prepare to cut off brace(21, figure 5) by drawing a cutting line on brace(21) to dimension(2).

(b) Remove PN 4034929 hinge(1) and PN 4034930 spacer(3) by drilling out existing rivets. Refer to T.O. 2-1-111.

(c) Cut off brace(21) at cutting line. Finish by removing excess material.

(d) Go to step b.(3).

(2) For seals previously repaired by this method, accomplish the following:

(a) Remove PN 4034929 hinge(1), PN 4034930 spacer(3) and PN 4046357 hinge cover(4) by drilling out existing rivets. Refer to T.O. 2-1-111.

(3) Locate existing forward hinge holes in segment as follows:

(a) Install augmentor convergent seal assembly(13) without forward hinge(1) into fixture, corrugated side up, positioning seal 0.250 inch ID sleeves over locator pin(8, figure 4A) and floating locator pin(9).

(b) Reinstall two locator bars(1) and two locator plates(2) matching clamp bars with support blocks using match numbers stamped on details. Secure in place with socket head cap screw(3), six places.

(c) Adjust clamp bars(4) by turning clamp knobs(5) clockwise(CW), three places, until segment upper face contacts all six tooling balls(10).

(d) Use drill plate assembly(11) for seals not previously repaired per this method and drill plate assembly(12) for seals previously repaired per this method.

(e) Place appropriate drill plate assembly(6) onto companion hinge support block(13) and secure with socket head cap screw(7).

(f) Loosen forward hinge drill plate assembly(6) adjustable drill bushings(14), four or six places.

(g) Use gage handle and 0.098 inch OD alignment pin(15) to set each drill plate and bushing. Install alignment pin through bushing and into existing rivet hole in convergent segment. Secure drill bushing and plate in place with socket head cap screw(16). Continue to adjust bushing position until alignment pin installs smoothly into rivet hole after bushing is secured in place.

(h) Remove adjustable drill plate assembly(6).

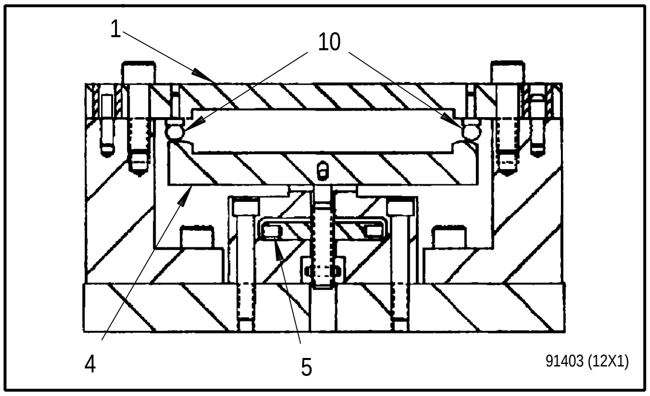


Figure 4A. Convergent Nozzle Segment Seal Hinge Cover - Replacement (Sheet 2 of 4)

(4) Install PN 4046357 cover(4, figure 5) at forward hinge as follows:

(a) Loosen two socket head cap screws(20, figure 4A) to allow locator(17) to float.

(b) Remove locator assembly(25) by loosening two knurled thumb nuts(19) and rotating swing bolt(18) away from assembly.

(c) Lift assembly off guide pin and diamond pin(24).

(d) Install replacement forward hinge detail(1, figure 5), PN 4077838, onto locator assembly(17, figure 4A) bottom face as follows:

1 Loosen two socket head cap screws(28) and slide locator pin(29) outward.

2 Place replacement hinge hole over fixed locator pin(30). Ensure hinge face rests flush on hinge locator block(27). If necessary, turn hinge over until face is flush with locator block detail.

3 Use two socket head cap screws(28) to push locator pins(29) inward until replacement hinge is secure against locator block detail.

(e) Install replacement hinge cover(4, figure 5) into locator(17, figure 4A), radius side down, and push cover against two dowel pins(26).

(f) Position locator assembly(25) over guide pin and diamond pin(24). Secure locator by raising two swing bolts(18) and tightening knurled thumb nuts(19).

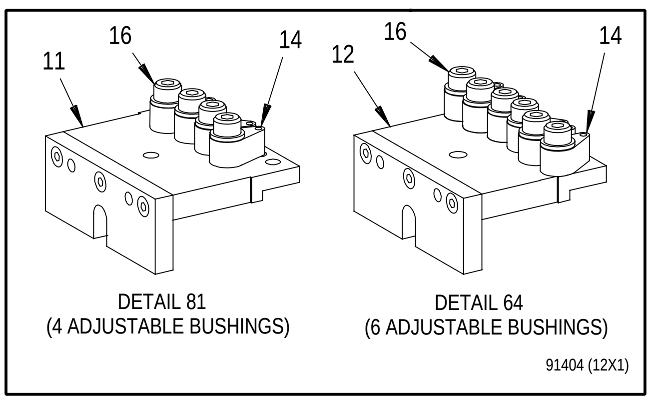


Figure 4A. Convergent Nozzle Segment Seal Hinge Cover - Replacement (Sheet 3 of 4)

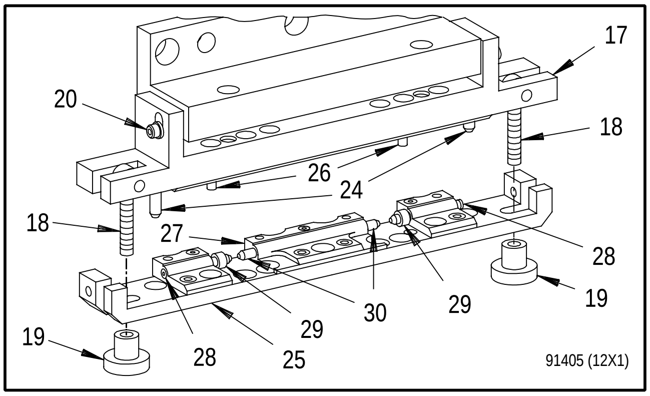


Figure 4A. Convergent Nozzle Segment Seal Hinge Cover - Replacement (Sheet 4 of 4)

(g) Install appropriate drill plate assembly(6) onto companion hinge support block(13) and secure with socket head cap screw(7).

(h) Check position of floating locator(17). When hinge and hinge cover are properly aligned with nozzle segment, secure locator in place with two socket head cap screws(20).

(i) Drill six holes in cover(4, figure 5) with No. 40 drill, using drill bushings as guides.

(j) Remove adjustable drill plate assembly(6, figure 4A) and locator assembly(25).

(k) Lower three clamp bars(4) and remove two locator plates(2) and two locator bars(1).

(l) Remove augmentor convergent segment from fixture.

(m) Loosen two socket head set screws(28) and remove two forward hinge details and forward hinge cover. Deburr all rivet holes.

(n) With cover(4, figure 5) and hinge(1) in position, install spacers(3) and secure with PN AN123320 rivets(20). Refer to T.O. 2-1-111.

(o) Position spacer(3) and install rivets in location(5), minimum edge distance waived. Refer to T.O. 2-1-111. If oversize rivets(AN123336) are used, install spacers(3), PN 4023967. Rivet heads may be ground to fit, as required.

c. Replace aft hinge cover as follows:

(1) For seals not previously repaired by this method, accomplish the following:

NOTE

For seals previously repaired by this method, go to step c.(2).

(a) Prepare to cut seal assembly(13) by drawing a cutting line on seal assembly to dimension(14).

CAUTION

Failure to remove hinge before cuting off seal assembly may damage aft hinge(17).

(b) (Optional) Remove PN 4038480 hinge(17) by drilling out existing rivets, six places. Set hinge aside for later reinstallation on the same seal assembly(13).

Legend for figure 4A

1. Locator bar
2. Locator plate
3. Socket head cap screw
4. Clamp bar
5. Clamp knob
6. Drill plate assembly
7. Socket head cap screw
8. Locator pin
9. Floating locator pin
10. Tooling ball
11. Drill plate assembly
12. Drill plate assembly
13. Hinge support block
14. Adjustable drill bushing
15. Alignment pin
16. Socket head cap screw
17. Floating locator
18. Swing bolt
19. Knurled thumb nut
20. Socket head cap screw
21. Aft hinge drill plate assembly
22. Hinge support block
23. Socket head cap screw
24. Guide/Diamond pin
25. Locator assembly
26. Dowel pin
27. Hinge locator block
28. Socket head cap screw
29. Adjustable locator pin
30. Fixed locator pin

(c) No damage to aft hinge is permissible. Replace damaged hinges per this work package.

(d) If hinge was not removed per step (b) above, remove the two existing rivets(18) closest to the hinge hole on the aft hinge(17).

(e) Scribe cut line on seal at dimension(14) and cut off seal assembly(13) at cutting line. Finish by removing excess material.

(f) If hinge(17) was removed in step (b), reinstall PN 4038480 hinge(17) using the four rivets(19) farthest from the hinge hole.

(g) Place cover(16) in proper position and clamp securely. Reference dimensions(11 and 15).

(h) Place cover and seal gaspath side down and use hinge(17) as template to transfer drill two rivet holes to cover(16) through two aftmost hinge holes using No. 40 drill.

(i) Drill two holes at location(9) through seal assembly(13) and cover(16) using No. 40 drill. Reference dimensions(10 and 12).

(j) Countersink four holes at locations(9 and 18) on gaspath (cover) side using a 100 degree countersink. Remove clamp and deburr rivet holes. Refer to T.O. 2-1-111.

(k) Install rivets(9 and 18) at locations shown, four places total. Refer to T.O. 2-1-111, minimum edge distance waived.

(2) For seals previously repaired by this method, accomplish the following:

(a) Remove cover(16) by drilling or grinding out rivets at locations(9 and 18).

NOTE

Some seal assemblies have been previously repaired with rivets at location(9) spaced approximately 1.3 inches from seal assembly centerline. Drill new holes at proper location(10). No corrective action required for the older holes.

(b) Position replacement cover(16) on seal assembly(13) and clamp securely.

(c) Place cover and seal gaspath face down and use seal assembly(13) as template to transfer drill four rivet holes to cover(16) using No. 40 drill. Reference dimension(10).

(d) Countersink four holes at locations(9 and 18) on gaspath (cover) side using a 100 degree countersink. Remove clamp and deburr rivet holes. Refer to T.O. 2-1-111.

(e) Install rivets at locations(9 and 18), four places total. Refer to T.O. 2-1-111, minimum edge distance waived.

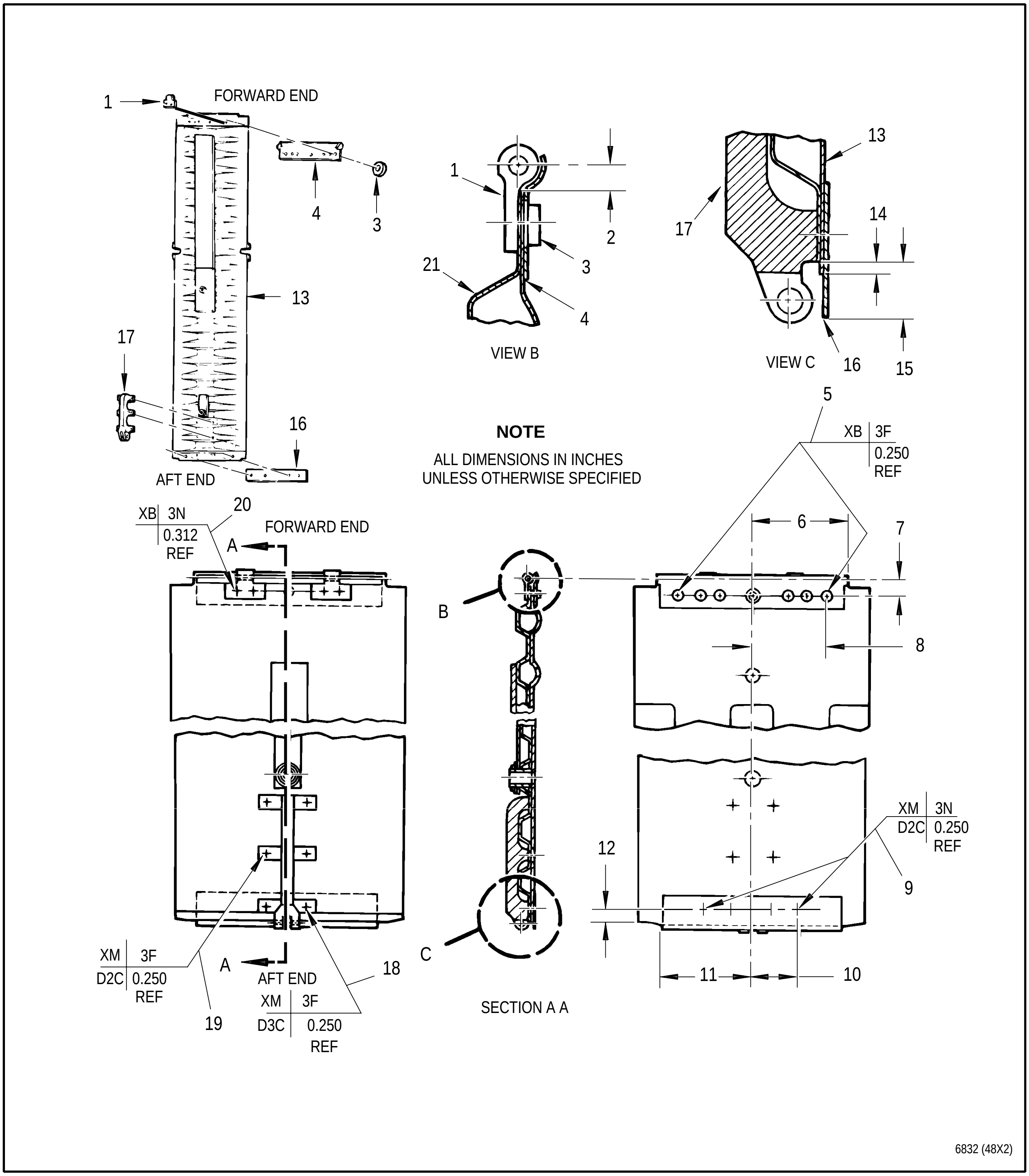


Figure 5. Augmentor Convergent Nozzle Segment Seal Assembly - Hinge Cover Replacement

Legend for figure 5

1. PN 4077838 hinge
2. 0.120 to 0.140 inch
3. PN 4034930 spacer, 6 places, or PN 4023967, 4 places maximum if AN123336 rivet is used on PN 4034929 hinge.
4. PN 4046357 hinge cover
5. Drill holes at this location for AN123319 rivets, 2 places
6. 1.920 to 1.935 inches
7. 0.305 inch
8. 1.470 inches, 2 places
9. Drill holes at this location for AN123619 rivets, 2 places
10. 1.000 to 1.200 inches maintaining 0.250 inch center to center spacing to adjacent rivet holes.
11. 1.790 to 1.810 inches
12. 0.150 inch
13. Seal assembly
14. 0.000 to 0.060 inch
15. 0.270 to 0.300 inch
16. PN 4046358 hinge cover
17. PN 4038480 hinge
18. AN123619 rivet, 2 places
19. AN123619 rivet, 4 places
20. AN123320 rivet, 4 places
21. Brace

8. AUGMENTOR CONVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - AFT HINGE REPLACEMENT.
(See figure 5 and Figure 5A.)

a. Replace augmentor convergent nozzle seal segment assembly aft hinge as follows:

(1) Prepare PWA 71030 drill fixture as follows:

(a) Place PWA 71030 on clean, flat surface and wipe fixture clean using isopropyl alcohol.

(b) Inspect fixture for any imperfections or missing details that may impair tool function.

(c) Remove two locator bars(1) and two locator plates(2) by unscrewing socket head cap screws(3), six places.

(d) Lower three clamp bars(4) by turning clamp knobs(5) counterclockwise(CCW).

(e) Remove two drill plate assemblies(6 and 21) by loosening or removing socket head cap screws(7 and 23). Remove third drill plate assembly stored on base.

(2) Remove unserviceable hinge(17, figure 5) by drilling and pushing out rivets(18 and 19). Refer to T.O. 2-1-111.

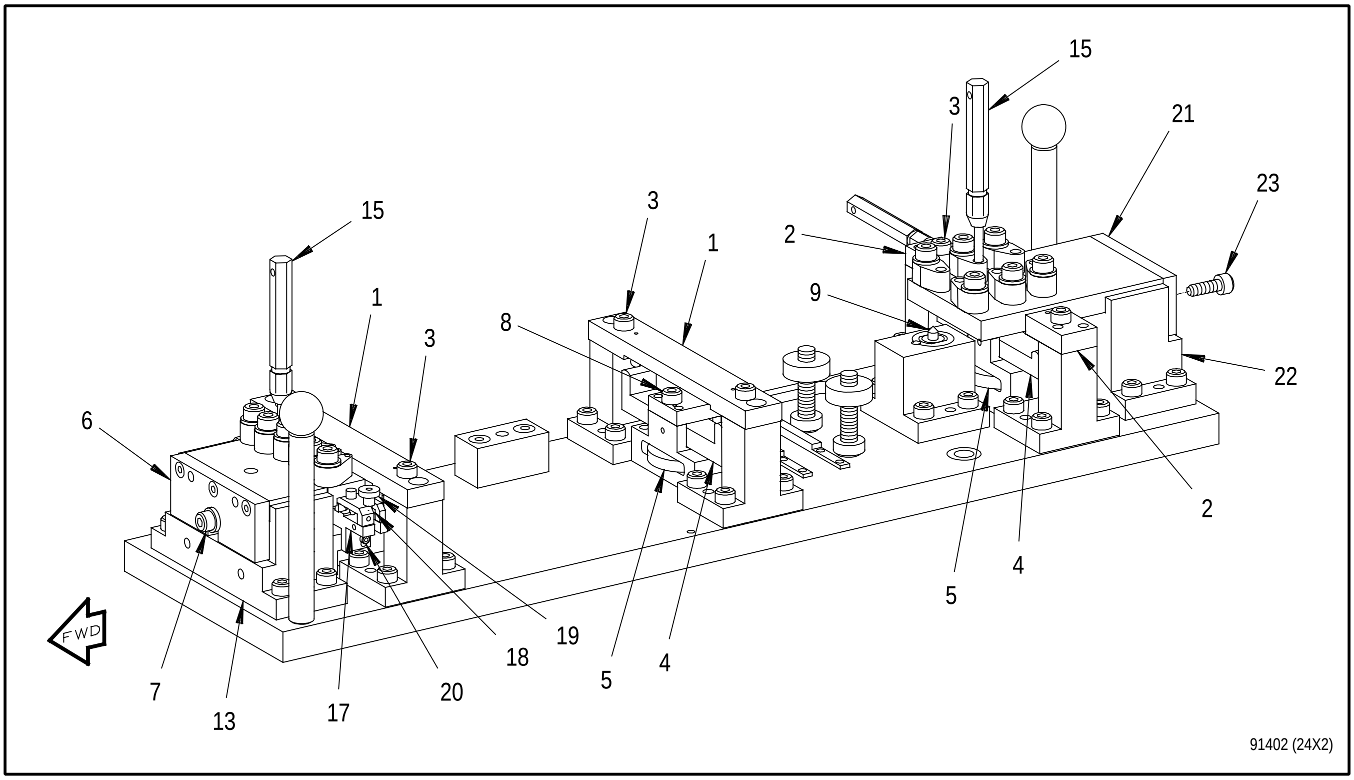


Figure 5A. Convergent Nozzle Segment Seal Aft Hinge - Replacement (Sheet 1 of 3)

(3) Locate existing aft hinge holes in segment as follows:

(a) Install augmentor convergent seal assembly(13) without aft hinge(17) into fixture, corrugated side up, positioning seal 0.250 inch ID sleeves over locator pin(8, figure 5A) and floating locator pin(9).

(b) Reinstall two locator bars(1) and two locator plates(2) matching clamp bars with support blocks using match numbers stamped on details. Secure in place with socket head cap screw(3), six places.

(c) Adjust clamp bars(4) by turning clamp knobs(5) clockwise(CW), three places, until segment upper face contacts all six tooling balls(10).

(d) Place aft drill plate assembly(21) onto companion hinge support block(22) and secure with socket head cap screw(23).

(e) Loosen aft hinge drill plate assembly(21) adjustable drill bushings(14), six places.

(f) Use gage handle and 0.098 inch OD alignment pin(15) to set each drill plate and bushing. Install alignment pin through bushing and into existing rivet hole in convergent segment. Secure drill bushing and plate in place with socket head cap screw. Continue to adjust bushing position until alignment pin installs smoothly into rivet hole after bushing is secured in place.

(g) Remove adjustable drill plate assembly(21).

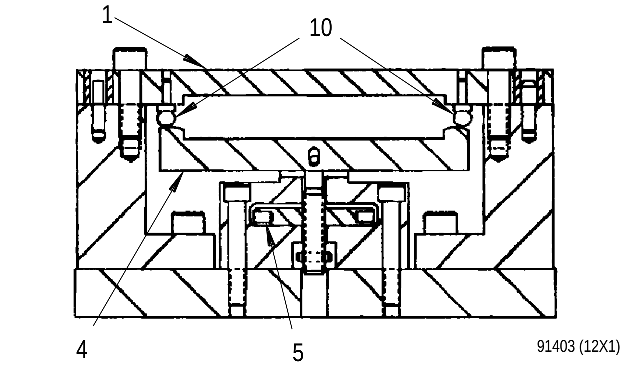


Figure 5A. Convergent Nozzle Segment Seal Aft Hinge - Replacement (Sheet 2 of 3)

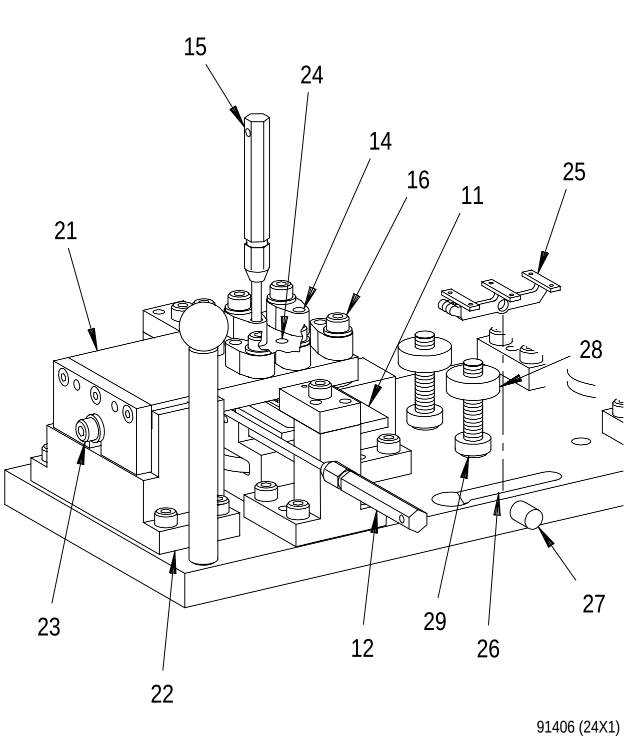


Figure 5A. Convergent Nozzle Segment Seal Aft Hinge - Replacement (Sheet 3 of 3)

Legend for figure 5A

1. Locator bar
2. Locator plate
3. Socket head cap screw
4. Clamp bar
5. Clamp knob
6. Drill plate assembly
7. Socket head cap screw
8. Locator pin
9. Floating locator pin
10. Tooling ball
11. Hinge spacer
12. Aft alignment pin
13. Hinge support block
14. Adjustable drill bushing
15. Alignment pin
16. Socket head cap screw
17. Floating locator
18. Swing bolt
19. Knurled thumb nut
20. Socket head cap screw
21. Aft hinge drill plate assembly
22. Hinge support block
23. Socket head cap screw
24. Socket set swivel pad clamp
25. Drilled aft hinge
26. Slot
27. Socket set swivel pad
28. Knurled jack screw
29. Jam nut

(4) Install aft hinge(17, figure 5) as follows:

(a) Position hinge spacer(11, figure 5A) on nozzle segment corrugated face, aligning spacer holes with existing rivet holes in segment.

(b) Place aft adustable drill plate assembly(21) upside down in palm of hand.

(c) Place replacement aft hinge detail, PN 4038480, lug side up, onto bottom face of drill plate assembly.

(d) Secure in place by installing aft alignment pin(12) through drill plate assembly holes and hinge hole.

(e) Install aft adjustable drill plate assembly(21) onto hinge support block(22) and secure in place using socket head cap screw(23).

(f) Adjust two knurled jack screws(28) until top face of screw contacts gas path face of convergent segment. Secure in place by tightening jam nuts(29).

(g) Ensure replacement hinge six lugs are flat against spacer(11). Secure replacement hinge against spacer by tightening socket set swivel pad clamp(24).

(h) Using a No. 40 drill bit, drill six holes in the new aft hinge(17, figure 5) through aft adjustable drill plate bushings(14, figure 5A).

(i) Remove aft alignment pin(12).

(j) Remove aft adjustable drill plate assembly(21).

(k) Lower three clamp bars(4) and remove two locator plates(2) and two locator bars(1).

(l) Remove augmentor convergent segment from fixture.

(m) Remove aft hinge detail. Deburr all rivet holes.

(n) Put drilled aft hinge(25), lug side up, into slot(26) in base. Secure hinge by tightening socket set swivel pad(27).

(o) Countersink aft hinge rivet holes. Refer to T.O. 2-1-111.

(p) Remove aft hinge and install on augmentor convergent nozzle seal segment assembly.

(q) Install rivets with manufactured head away from hinge and check for proper location. See figure 5. Flare rivets to secure hinge. Refer to T.O 2-1-111.

9. AUGMENTOR CONVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - FORWARD HINGE REPLACEMENT.
(See figure 5 and Figures 6 and 6A.)

a. Replace augmentor convergent nozzle seal segment assembly forward hinge as follows:

(1) Prepare PWA 71030 drill fixture as follows:

(a) Place PWA 71030 on clean, flat surface and wipe fixture clean using isopropyl alcohol.

(b) Inspect fixture for any imperfections or missing details that may impair tool function.

(c) Remove two locator bars(1, figure 6) and two locator plates(2) by unscrewing socket head cap screws(3), six places.

(d) Lower three clamp bars(4) by turning clamp knobs(5) counterclockwise(CCW).

(e) Remove two drill plate assemblies(6 and 21) by loosening or removing socket head cap screws(7 and 23). Remove third drill plate assembly stored on base.

(2) Remove unserviceable augmentor convergent nozzle seal segment forward hinge(1, figure 5) from augmentor convergent nozzle seal assembly(13) by drilling and pushing out rivets(20).

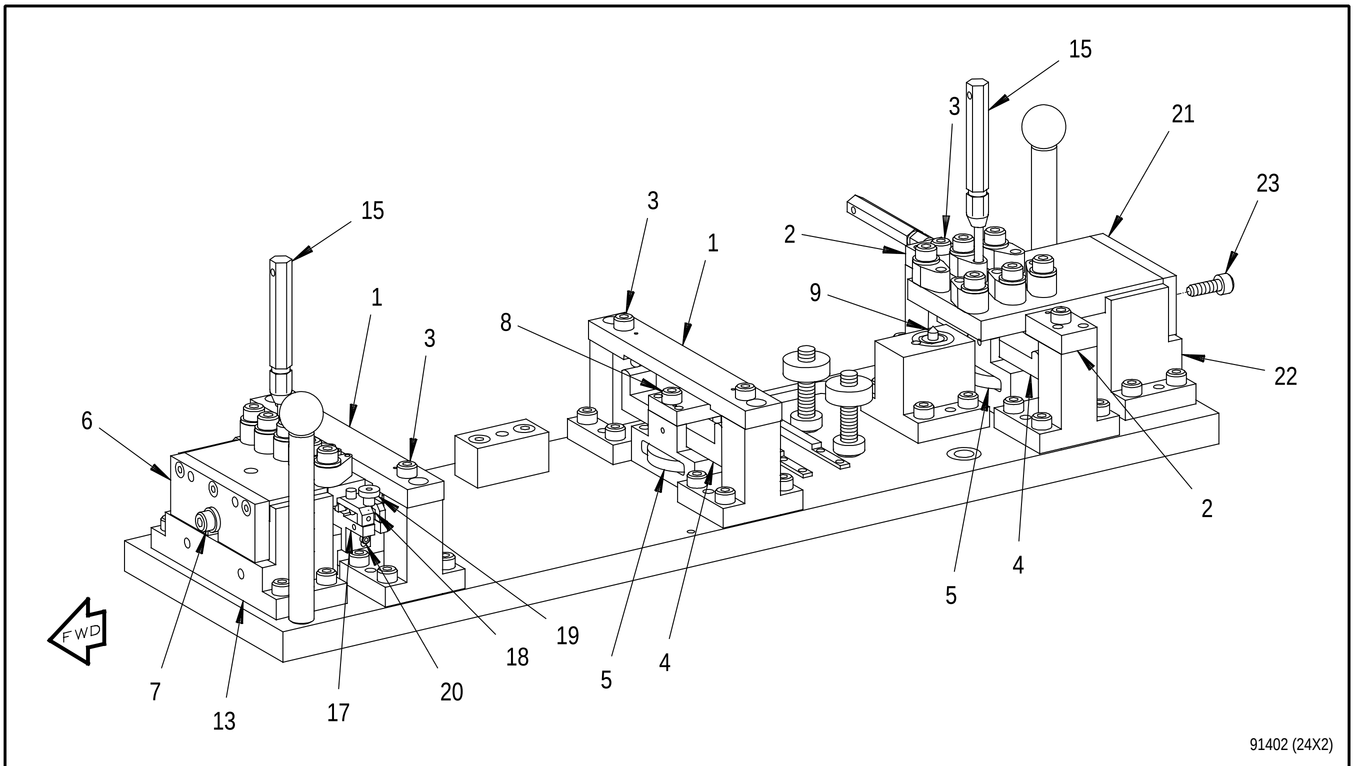


Figure 6. Convergent Nozzle Segment Seal Forward Hinge - Replacement (Sheet 1 of 4)

(3) Locate existing forward hinge holes in segment as follows:

(a) Install augmentor convergent seal assembly(13) without forward hinge(1) into fixture, corrugated side up, positioning seal 0.250 inch ID sleeves over locator pin(8, figure 6) and floating locator pin(9).

(b) Reinstall two locator bars(1) and two locator plates(2) matching clamp bars with support blocks using match numbers stamped on details. Secure in place with socket head cap screw(3), six places.

(c) Adjust clamp bars(4) by turning clamp knobs(5) clockwise(CW), three places, until segment upper face contacts all six tooling balls(10).

(d) Use drill plate assembly(11) for seals not previously repaired per this method and drill plate assembly(12) for seals previously repaired per this method.

(e) Place appropriate drill plate assembly(6) onto companion hinge support block(13) and secure with socket head cap screw(7).

(f) Loosen forward hinge drill plate assembly(6) adjustable drill bushings(14), four or six places.

(g) Use gage handle and 0.098 inch OD alignment pin(15) to set each drill plate and bushing. Install alignment pin through bushing and into existing rivet hole in convergent segment. Secure drill bushing and plate in place with socket head cap screw(16). Continue to adjust bushing position until alignment pin installs smoothly into rivet hole after bushing is secured in place.

(h) Remove adjustable drill plate assembly(6).

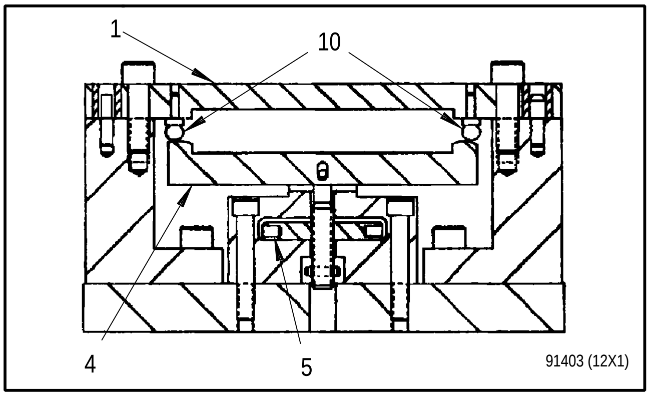


Figure 6. Convergent Nozzle Segment Seal Forward Hinge - Replacement (Sheet 2 of 4)

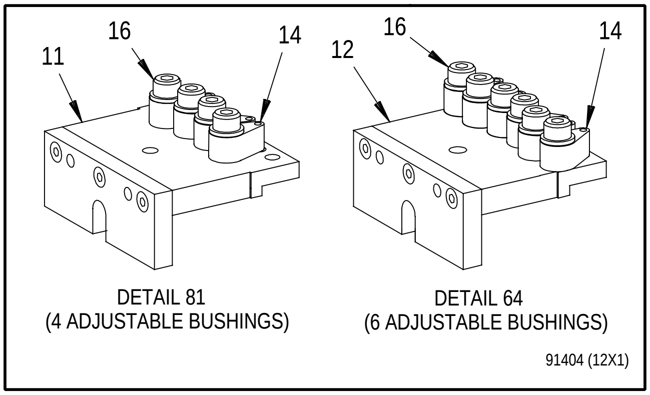


Figure 6. Convergent Nozzle Segment Seal Forward Hinge - Replacement (Sheet 3 of 4)

(4) Install forward hinge(1, figure 5) as follows:

(a) Loosen two socket head cap screws(20, figure 6) to allow locator(17) to float.

(b) Remove locator assembly(25) by loosening two knurled thumb nuts(19) and rotating swing bolt(18) away from assembly.

(c) Lift assembly off guide pin and diamond pin(24).

(d) Install replacement forward hinge detail(1, figure 5), PN 4034929, onto locator assembly(25, figure 6) bottom face as follows:

1 Loosen two socket head cap screws(28) and slide locator pin(29) outward.

2 Place replacement hinge hole over fixed locator pin(30). Ensure hinge face rests flush on hinge locator block(27). If necessary, turn hinge over until face is flush with locator block detail.

3 Use two socket head cap screws(28) to push locator pins(29) inward until replacement hinge is secure against locator block detail.

(e) Position locator assembly(25) over guide and diamond pin(24). Secure locator by raising two swing bolts(18) and tightening knurled thumb nuts(19).

(f) Install appropriate drill plate assembly(6) onto companion hinge support block(13) and secure with socket head cap screw(7).

(g) Check position of floating locator(17). When hinge is properly aligned with nozzle segment and hinge cover, secure locator in place with two socket head cap screws(20).

(h) Drill two holes in hinge(1, figure 5) with No. 40 drill, using drill bushings as guides.

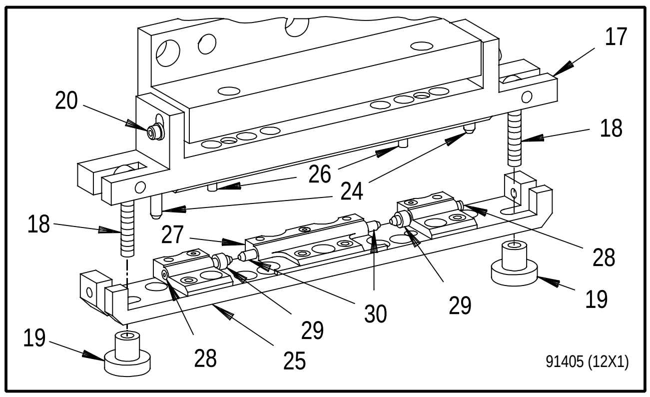


Figure 6. Convergent Nozzle Segment Seal Forward Hinge - Replacement (Sheet 4 of 4)

Legend for figure 6

1. Locator bar
2. Locator plate
3. Socket head cap screw
4. Clamp bar
5. Clamp knob
6. Drill plate assembly
7. Socket head cap screw
8. Locator pin
9. Floating locator pin
10. Tooling ball
11. Drill plate assembly
12. Drill plate assembly
13. Hinge support block
14. Adjustable drill bushing
15. Alignment pin
16. Socket head cap screw
17. Floating locator
18. Swing bolt
19. Knurled thumb nut
20. Socket head cap screw
21. Aft hinge drill plate assembly
22. Hinge support block
23. Socket head cap screw
24. Guide/Diamond pin
25. Locator assembly
26. Dowel pin
27. Hinge locator block
28. Socket head cap screw
29. Adjustable locator pin
30. Fixed locator pin

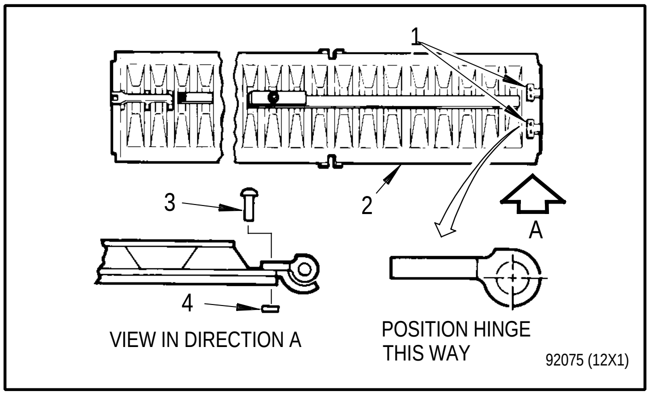
(i) Remove adjustable drill plate assembly(6, figure 6).

(j) Lower three clamp bars(4) and remove two locator plates(2) and two locator bars(1).

(k) Remove augmentor convergent segment from fixture.

(l) Remove forward hinge detail. Deburr all rivet holes.

(m) Position hinge(1, figure 6A), with part number facing up, on seal segment(2) as shown. Install rivets(3) and spacers(4). Position rivet heads as shown. See figure 5. Flare rivets to secure. Refer to T.O. 2-1-111.



1. Forward hinge
2. Seal segment
3. Rivet
4. Spacer

Figure 6A. Augmentor Convergent Nozzle Seal Segment Front Hinge - Replacement

10. Deleted.

11. AUGMENTOR CONVERGENT NOZZLE SEAL SEGMENT ASSEMBLY - ANTIGALLING COMPOUND APPLICATION.

NOTE

Surface preparation not required.

a. Apply PWA 36545 antigalling compound. Refer to T.O. 2-1-111, SPOP 748.

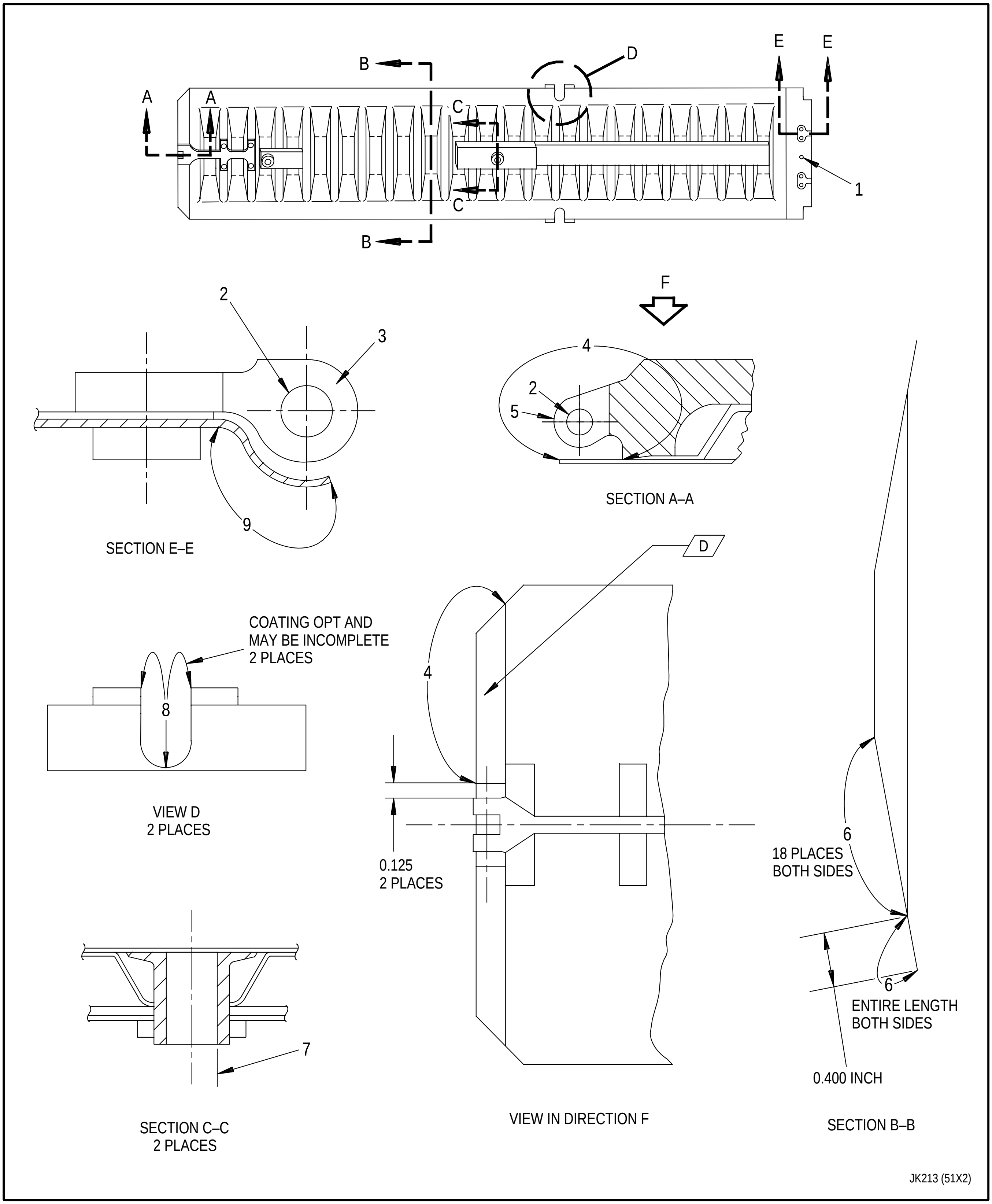


Figure 7. Augmentor Convergent Nozzle Seal Segment Assembly - Plasma Coat Replacement and Antigalling Compound Application

Legend for figure 7

1. No plasma coat permitted in rivet hole or countersunk area.
2. No plasma coat permitted on this surface.
3. No plasma coat permitted on hinge
4. mating surfaces, 4 places. Apply PWA 53-1 or PWA 256-1 plasma coat to area D, both sides.
5. No plasma coat permitted on hinge mating surfaces, 2 places.
6. Apply PWA 53-1 or PWA 256-1 plasma coat per text.
7. No plasma coat permitted on this diameter.
8. Apply PWA 53-1 or PWA 256-1 plasma coat across total thickness. Coating thickness requirement waived, but complete coverage required.
9. Apply PWA 36545 antigalling compound per paragraph 11.

WORK PACKAGE

TECHNICAL PROCEDURES

LINER, AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	18	2 - 8	17	9 - 10	18

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Introduction and General Information	T.O. 2J-F100-53-1
Qualified Repair Source Listing (QRSL)	WP 606 00
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Liner Augmentor Convergent Nozzle Segment Seal - Repair	WP 308 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
RIVET	2072839	2
WASHER	4071138	4

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
3	AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL LINER - DISASSEMBLY	
	FIXTURE, AUGMENTOR NOZZLE, CONVERGENT SEAL LINER, ASSY, DISASSY	PWA 57817
6	AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL LINER - ANCHOR BOLT REPLACEMENT	
	FIXTURE, AUGMENTOR NOZZLE, CONVERGENT SEAL LINER ANCHOR BOLT INSTALLATION	PWA 57831
7	AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL LINER - ASSEMBLY	
	FIXTURE, AUGMENTOR NOZZLE, CONVERGENT SEAL LINER, ASSY, DISASSY	PWA 57817

ILLUSTRATED SUPPORT EQUIPMENT

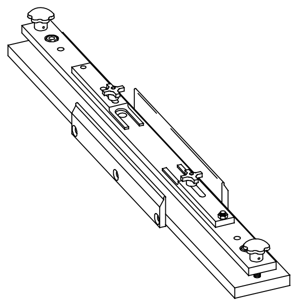


Figure T1. PWA 57817 FIXTURE

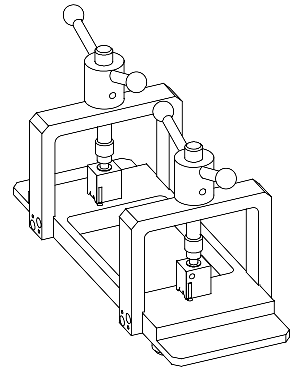


Figure T2. PWA 57831 FIXTURE

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor convergent nozzle segment seal liner. This repair applies to both configurations of seal liners.

2. PRELIMINARY INSTRUCTIONS.

a. PN 4071130 assemblies must be repaired as an assembly set because detail parts are not interchangeable with PN 4078304.

b. Refer to WP 308 00 for inspection and limits.

3. AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL LINER - DISASSEMBLY.

(See Figure 1)

a. Remove rivets holding facesheet to backsheet brace. Refer to T.O. 2-1-111. Discard expendables.

b. Separate facesheet from backsheet brace using PWA 57817 fixture or equivalent as follows:

(1) Loosen both inboard hand knobs and retract both prongs.

(2) Turn both outboard hand knobs counterclockwise until reaction plate stops rising.

(3) Place liner assembly, facesheet up, on PWA 57817 fixture base so both anchor bolts are positioned in two holes in base and axial edges of liner brace rest on rails.

(4) Advance both prongs inboard to engage backsheet brace cooling channels and align both bolts in recess of reaction plate. Secure prongs using inboard hand knobs.

(5) Turn outboard hand knobs clockwise until reaction plate contacts base.

CAUTION

Sliding facesheet will damage facesheet coating.

(6) Remove liner facesheet from backsheet brace without sliding facesheet.

(7) Turn outboard hand knobs counterclockwise until reaction plate stops rising.

(8) Loosen both inboard hand knobs and retract both prongs.

(9) Remove backsheet brace.

CAUTION

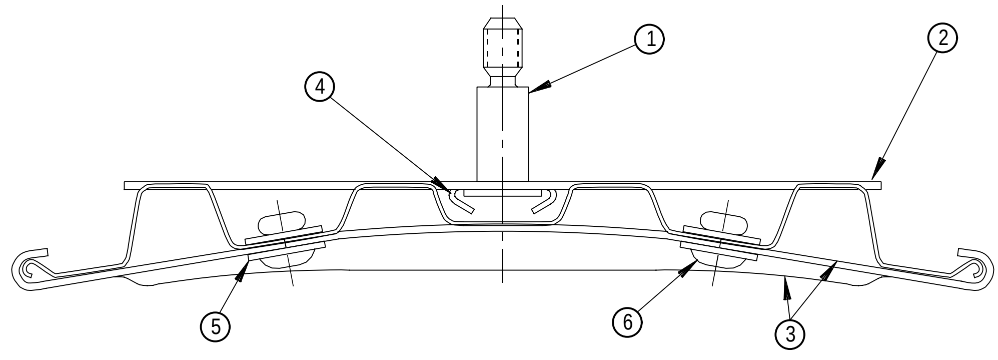
To avoid coating damage, do not clean facesheet.

c. To reuse backsheet brace, accomplish the following:

(1) Clean per SPOP 9, 208, or 209 before reassembly. Do not clean facesheet. Refer to T.O. 2-1-111.

(2) Inspect brace per WP 308 00.

d. If not serviceable, send damaged part (facesheet or backsheet brace) to approved repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.



1. Anchor bolt
2. Backsheet brace assembly
3. Facesheet
4. Anchor bolt retaining clip
5. Washer, PN 4071138, 4 places
6. Rivet, PN 2072839, 2 places

Figure 1. Augmentor Convergent Nozzle Segment Seal Liner - Assembly

4. AUGMENTOR CONVERGENT SEGMENT SEAL LINER - REPAIR.

a. Repair is proprietary. Refer to T.O. 2J-F100-53-1, WP 606 00, for Qualified Repair Source Listing (QRSL) by Task Code:

JGDFGAA	Facesheet cracks or missing material
JGDFGAB	Facesheet finger seal hardface coating missing
JGDFGAC	PWA 295 silicide coating wear
JGDFGAD	Facesheet rivet hole enlongation
JGDFGAE	Facesheet aft end wear
JGDFGAF	Anchor bolt damaged or stripped.
JGDFGAG	Backsheet brace cracks

5. AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL LINER - RIVET REPLACEMENT. (See figure 1.)

a. Remove rivets holding facesheet to backsheet brace. Refer to T.O. 2-1-111. Discard expendables.

b. Inspect areas hidden while assembled, per WP 308 00 and as follows:

(1) Elongated rivet holes:

(a) Backsheet brace, 0.132 inch maximum elongation.

(b) Facesheet, 0.190 inch maximum elongation.

(2) Evidence of coating must be present around facesheet rivet holes.

c. Replace anchor bolts as necessary per paragraph 6.

d. Install new PN 2072839 rivets into assembly with two new PN 4071138 washers on each rivet as shown in figure 1.

CAUTION

To avoid coating damage, do not buck rivets to upset.

e. Upset rivets. Do not buck to upset. Refer to T.O. 2-1-111.

f. Inspect completed assembly as follows:

(1) Inspect installed rivets and washers. Refer to T.O. 2-1-111.

(2) Ensure backsheet brace is properly assembled to facesheet. Backsheet brace cooling channels should lay flat against facesheet without any gaps or bowing. See figure 1.

(3) Ensure facesheet has no chipped or missing coating and assembly is serviceable per WP 308 00.

6. AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL LINER - ANCHOR BOLT REPLACEMENT.
(See figure 1 and Figures 2 and 3.)

a. Disassemble augmentor convergent nozzle seal assembly per paragraph 3. See figure 1.

CAUTION

To avoid seal assembly damage, do not use excessive force to bend anchor bolt retaining clip when removing damaged bolt.

b. Using minimum amount of force and standard shop equipment (pliers), carefully bend backsheet retaining clip away from anchor bolt sufficiently to remove bolt. At no time should clip be bent beyond 90 degrees (perpendicular to surface of brace). See figure 2.

c. Remove and discard anchor bolt.

d. Install new anchor bolt using PWA 57831 fixture or equivalent as follows: (See figure 3)

(1) Visually inspect fixture for damage, wipe clean, and place on table.

(2) Raise power screw assembly until lower threaded portion engages upper support rail.

(3) Install convergent liner backsheet over four dowel pins of fixture base.

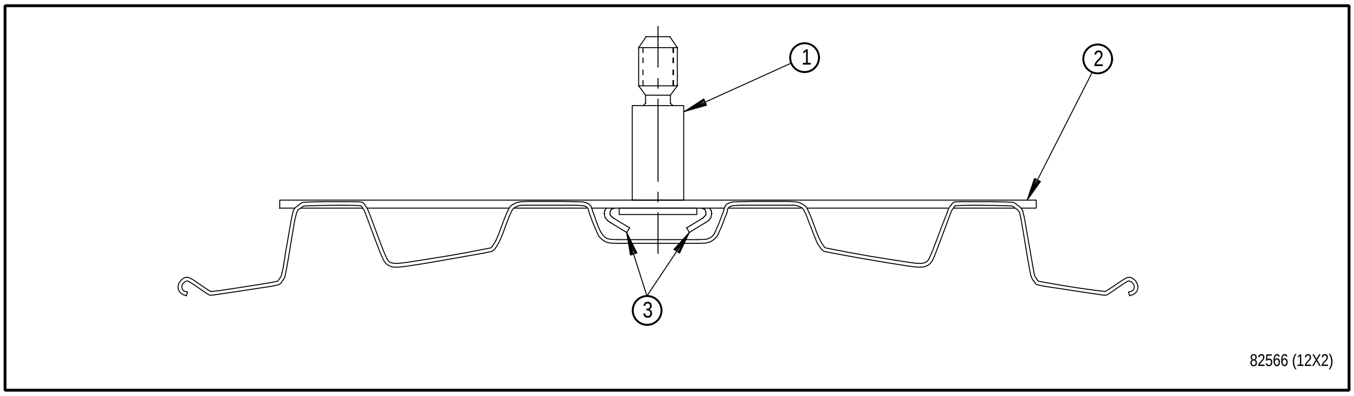
(4) Place replacement anchor bolt through backsheet brace and into clearance hole of fixture base.

(5) Hold flaring block of power screw assembly, while turning and lowering screw, until upper threads engage into support rail. Ensure dowel pins engage clearance cuts in side of flaring block. Dowels will guide block while bending retaining clips.

(6) Rotate power screw handle to bend clips. Continue turning screw until flaring block bottoms on base plate.

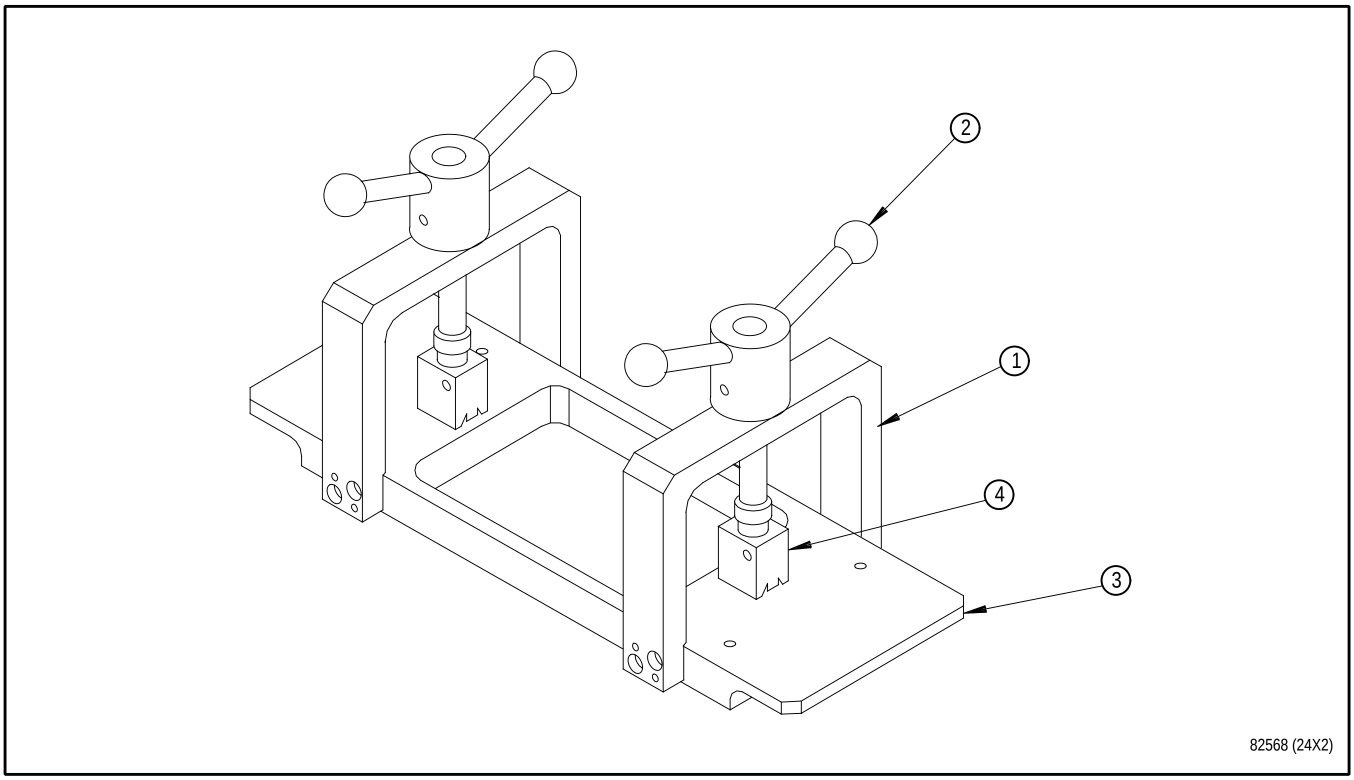
(7) Raise power handle, engaging lower threads into upper support rail, and remove backsheet brace/bolt assembly.

e. Assemble backsheet brace and facesheet per paragraph 7.



1. Anchor bolt
2. Backsheet brace assembly
3. Anchor bolt retaining clips

Figure 2. Backsheet Brace with Anchor Bolt Installed - Prior to Assembly with Facesheet



1. Upper support rail
2. Power screw
3. Fixture base
4. Dowel pins, 4 places

Figure 3. Augmentor Convergent Nozzle Segment Seal Liner - Anchor Bolt Replacement Using PWA 57831 Fixture

7. AUGMENTOR CONVERGENT NOZZLE SEGMENT SEAL LINER - ASSEMBLY.
(See figure 1.)

a. Inspect areas hidden while assembled, per WP 308 00 and as follows:

(1) Elongated rivet holes:

(a) Backsheet brace, 0.132 inch maximum elongation.

(b) Facesheet, 0.190 inch maximum elongation.

(2) Evidence of coating must be present around facesheet rivet holes.

b. Replace anchor bolts as necessary per paragraph 6.

NOTE

PN 4071130 assemblies must be repaired as an assembly set because detail parts are not interchangeable with PN 4078304.

c. Assemble facesheet and backsheet brace as follows using PWA 57817 fixture or equivalent:

(1) Loosen both inboard hand knobs and retract both prongs.

(2) Turn both outboard hand knobs counterclockwise until reaction plate stops rising.

(3) Place backsheet brace on PWA 57817 base so both anchor bolts are positioned in both holes in base and axial edges of brace rest on rails. Ensure anchor bolts are installed into brace.

(4) Advance both prongs inboard to engage backsheet brace cooling channels and align both bolts in recess of reaction plate. Secure prongs to brace using inboard hand knobs.

(5) Turn outboard hand knobs clockwise until reaction plate contacts base.

CAUTION

Sliding facesheet will damage facesheet coating.

(6) Place facesheet on liner support. Align rivet holes in facesheet and brace. Do not slide facesheet.

(7) Turn both outboard hand knobs counterclockwise until reaction plate stops rising.

(8) Loosen both inboard hand knobs and retract both prongs.

(9) Remove assembled liner. Verify all backsheet brace curled edges are fully engaged in facesheet curled edges.

CAUTION

Assemblies must be reassembled using washers and rivets specified to avoid seal failure.

d. Install new PN 2072839 rivets into assembly with two new PN 4071138 washers on each rivet as shown in figure 1.

CAUTION

Bucking rivets to upset may cause coating damage.

e. Upset rivets. Do not buck to upset. Refer to T.O. 2-1-111.

f. Inspect completed assembly as follows:

(1) Inspect installed rivets and washers. Refer to T.O. 2-1-111.

(2) Ensure backsheet brace is properly assembled to facesheet. Backsheet brace cooling channels should lay flat against facesheet without any gaps or bowing. See figure 1.

(3) Ensure facesheet has no chipped or missing coating and assembly is serviceable per WP 308 00.

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL, AUGMENTOR BALANCE NOZZLE SEGMENT -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

THIS WORK PACKAGE SUPERSEDES WP 409 00 THROUGH AND INCLUDING CHANGE 7.

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 6	9				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Introduction and General Information	T.O. 2J-F100-53-1
General Repair Procedures - Compound, Antigalling (PWA 36545) Application (SPOP 748)	SWP 098 07

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Compound, antigalling (PWA 36545)	Everlube 382

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
Rivet	AN123318	7
Rivet	AN123319	2

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor balance nozzle segment assembly.

2. AUGMENTOR BALANCE NOZZLE SEGMENT SEAL ASSEMBLY - HINGE AND HINGE COVER REPLACEMENT.

(See Figure 1.)

a. Replace hinge(6) as follows:

(1) Remove old hinge(6) by drilling out rivets(3) and (11).

(2) Clamp new hinge(6) in position on seal(1) to dimensions(7) and (12).

(3) Transfer drill seven holes (2 are countersunk on hinge) into new hinge(6) using seal(1) and cover(12) as template. Deburr holes.

(4) Rivet new hinge(6) to seal assembly using rivets(3) and (11). Refer to T.O. 2-1-111 to rivet.

b. Replace cover(2) as follows:

(1) Remove old cover(2) and spacers(4) by drilling out rivets(3) and (5). Do not remove hinge(6) unless it is being replaced.

(2) Clamp new cover(2) in position on seal(1) to dimensions(7) and (9).

(3) Transfer drill seven holes into new cover(2) using seal and hinge as template. Deburr holes.

(4) Rivet new cover(2) and spacers(4) to seal assembly using rivets(5) and (3). Rivet per T.O. 2-1-111, minimum edge distance waived.

Legend for figure 1

1. Seal assembly
2. Cover
3. PN AN123318 Rivet, 5 places
4. Spacer
5. PN AN123319 Rivet, 2 places
6. Hinge
7. 0.035 to 0.055 inch
8. 0.360 inch reference
9. 1.985 inches maximum
10. 0.175 to 0.185 inch
11. PN AN123318 Rivet, 2 places
12. 1.200 to 1.210 inch

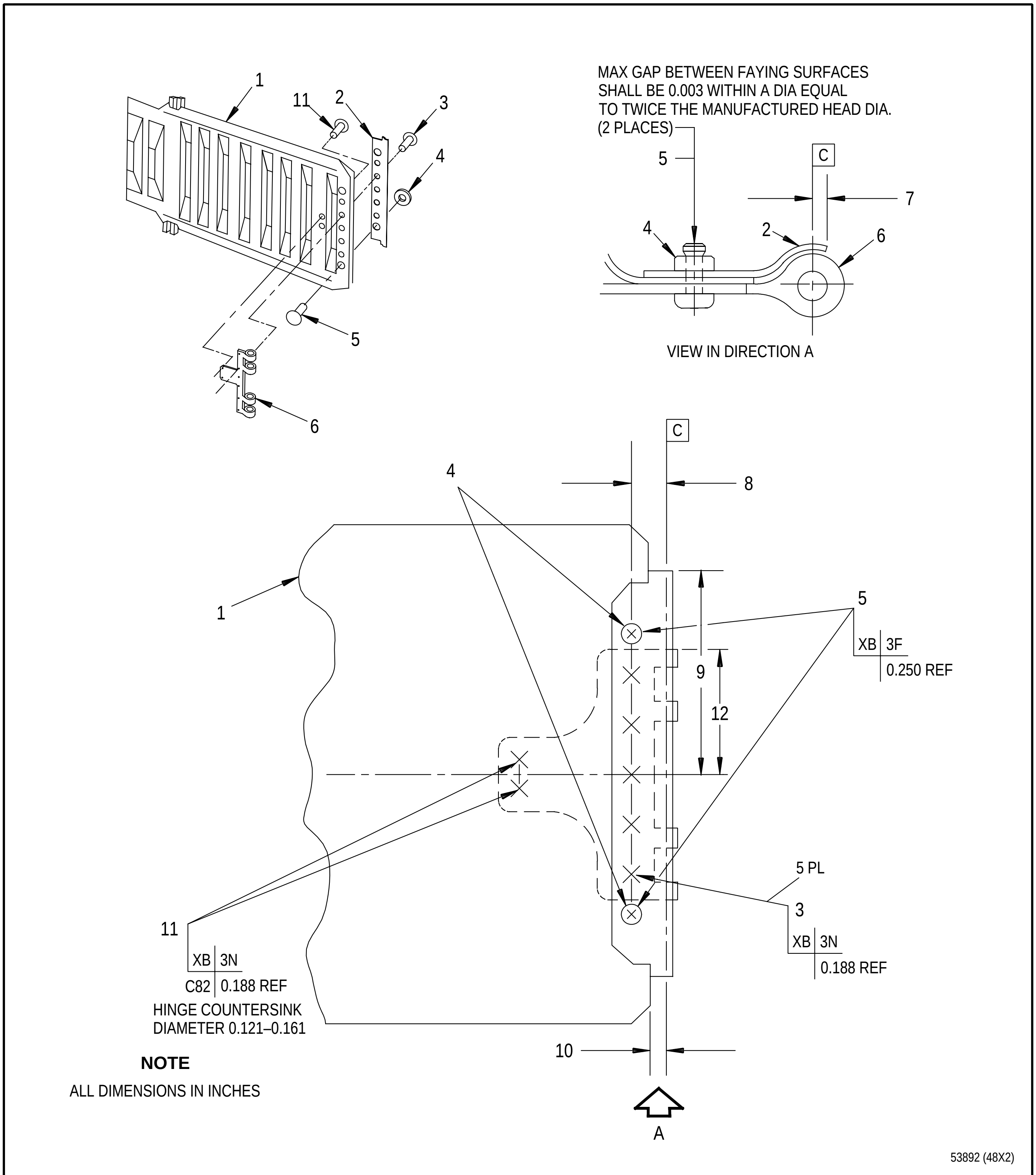


Figure 1. Augmentor Balance Nozzle Segment Seal Assembly - Hinge and Hinge Cover Replacement

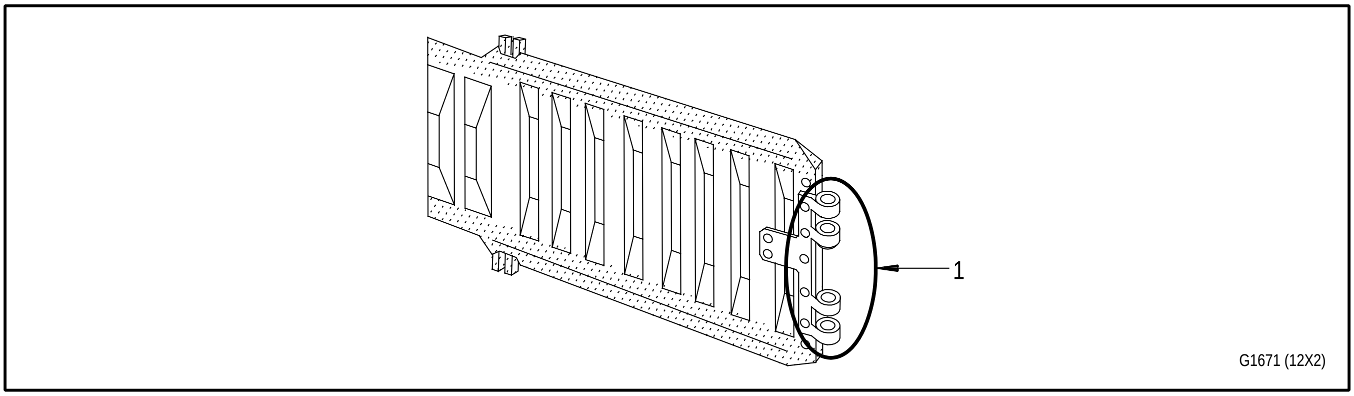
3. AUGMENTOR BALANCE NOZZLE SEGMENT SEAL ASSEMBLY - ANTIGALLING COMPOUND APPLICATION.

(See Figure 2.)

NOTE

Coating in surrounding areas optional and can be incomplete.

a. Apply PWA 36545 antigalling compound. See figure 2. Refer to T.O. 2J-F100-53-1, SWP 098 07, (SPOP 748).



1. Apply antigalling compound to enclosed area including holes.

Figure 2. Augmentor Balance Nozzle Segment Seal Assembly - Antigalling Compound Application

WORK PACKAGE

TECHNICAL PROCEDURES

NOZZLE SEGMENT, CONVERGENT, AUGMENTOR -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 8	19				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Surface Preparation for Plasma Coating (Titanium and Non-titanium Parts)	SPOP 170
Light Duty Cleaning of Titanium Parts (Solvent Cleaning Method and Alkaline Cleaning Methods)	SPOP 208
Dry Grit Blast and Cleaning (Direct Pressure-type Machine)	SPOP 218
Standard Fluorescent Penetrant Inspection (Local Application)	SPOP 70

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ALCOHOL, ISOPROPYL	PMC 9094
CLOTH	MIL-C-85043
STONE, ABRASIVE	FINE
TAPE	PMC 4235
TAPE	PMC 4273

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
RIVET	AN123336	4

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor convergent nozzle segment.

2. AUGMENTOR CONVERGENT NOZZLE SEGMENT - RETAINER REPLACEMENT.

(See Figure 1.)

a. Grind off rivet heads on retainer side. Drift out rivets and discard. Refer to T.O. 2-1-111.

b. Transfer drill rivet holes from existing retainer to intermediate disposable transfer medium. Use No. 30 drill, 0.128 to 0.132 inch diameter. Transfer medium must maintain hole edge distance, two places, to ensure proper assembly location. See figure 1.

c. Transfer drill rivet holes from transfer medium to new retainer. Use No. 30 drill, 0.128 to 0.132 inch diameter and maintain edge distance, two places. See figure 1.

d. Discard old retainer and transfer medium.

e. Deburr new rivet holes.

f. Position new retainer on nozzle segment and rivet in position. See figure 1. Refer to T.O. 2-1-111.

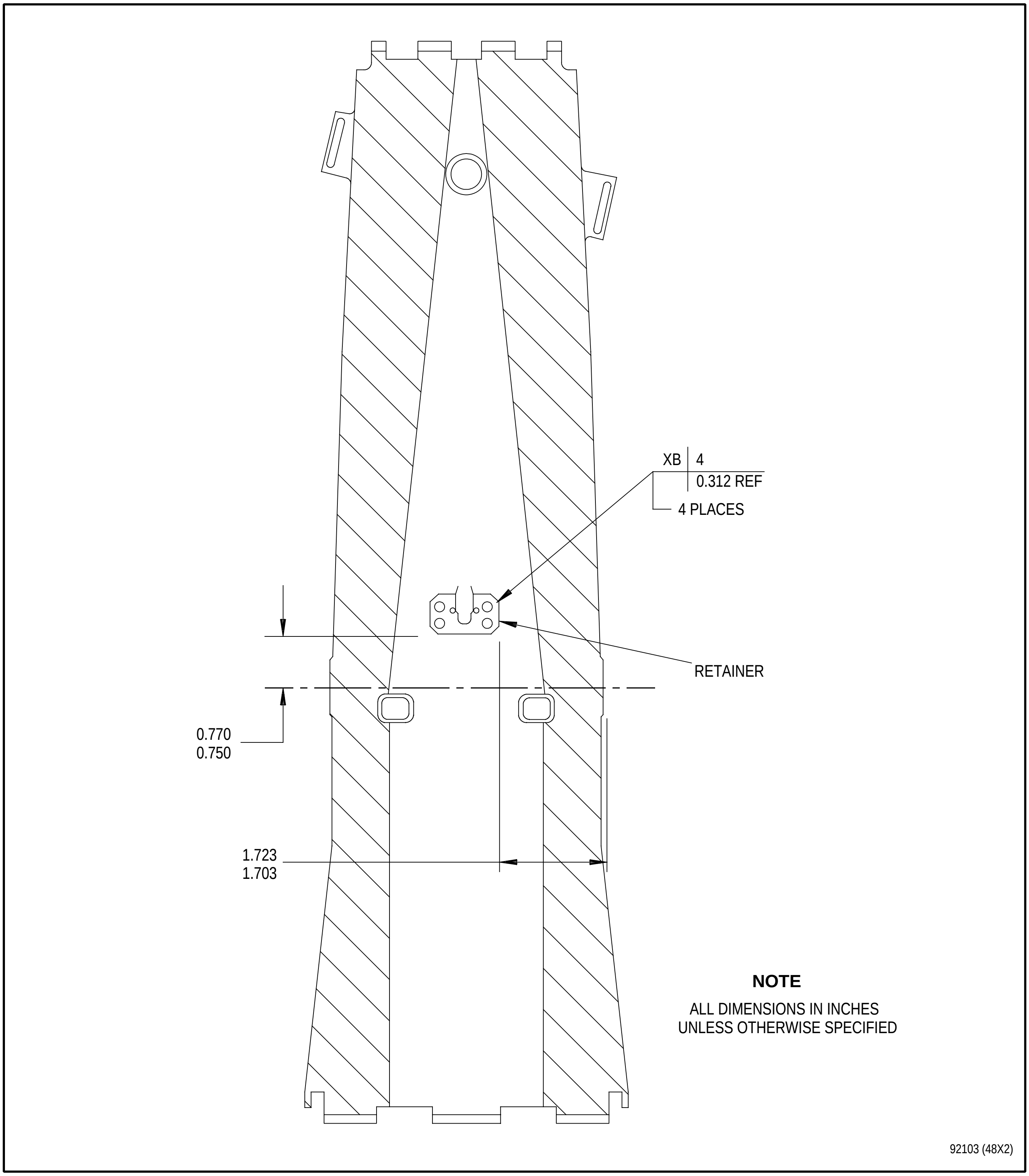


Figure 1. Augmentor Convergent Nozzle Segment - Retainer Replacement

3. AUGMENTOR CONVERGENT NOZZLE SEGMENT - PLASMA COATING STRIPPING AND APPLICATION.

(See Figure 2.)

NOTE

- There are three acceptable coatings: PWA 46, PWA 53-1, and PWA 256-1.
- Segment material is PWA 1267, titanium base alloy.

a. Mask areas not being stripped with PMC 4235 and PMC 4273 tape or equivalent. See figure 2. Refer to T.O. 2-1-111.

b. Strip coating by grit blasting per SPOP 218 using 60 grit aluminum oxide. Refer to T.O. 2-1-111.

c. Remove masking.

d. Clean segment per SPOP 208, method A or B. Refer to T.O. 2-1-111.

e. Select coating to be applied as follows:

(1) If PWA 46 or PWA 256-1 is selected, refer to T.O. 2-1-111 for approved source and application procedure. See figure 2 and Views A, B, C, D, and E. Go to step j.

(2) If PWA 53-1 is selected, refer to T.O. 2-1-111 for application procedure. Go to step f.

f. Mask with PMC 4235 and PMC 4273 tape or equivalent. See figure 2. Refer to T.O. 2-1-111.

g. Grit blast coat area per SPOP 170. See figure 2. Refer to T.O. 2-1-111.

h. If surface of grit blasted part becomes contaminated with dust, fingerprints, oil, or other, solvent wipe part per SPOP 208. Refer to T.O. 2-1-111.

i. Replace masking as required.

CAUTION

Failure to apply coating within specified time after grit blasting or cleaning, may cause coating to be rejected.

j. Apply coating, preferably within 2 hours of grit blasting or cleaning, to a thickness of 0.002 to 0.004 inch except 0.002 to 0.006 inch in area C. See figure 2 and Views C, D, and E.

k. Remove masking.

l. Wipe part using cloth moistened with isopropyl alcohol (PMC 9094) to remove tape residue.

m. Inspect segment for correct coating application. Refer to T.O. 2-1-111 for quality requirements.

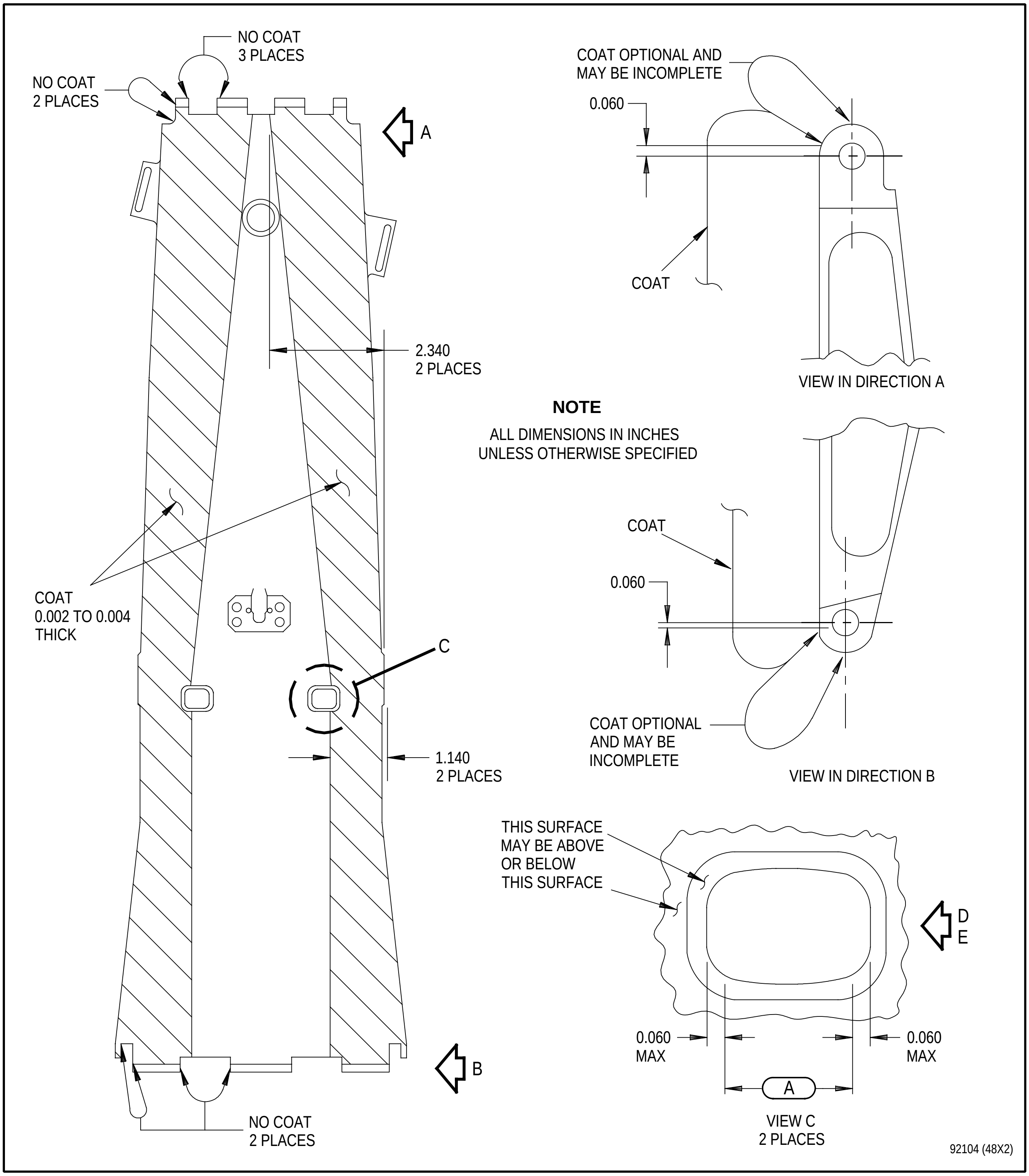


Figure 2. Augmentor Convergent Nozzle Segment - Plasma Coating (Sheet 1 of 2)

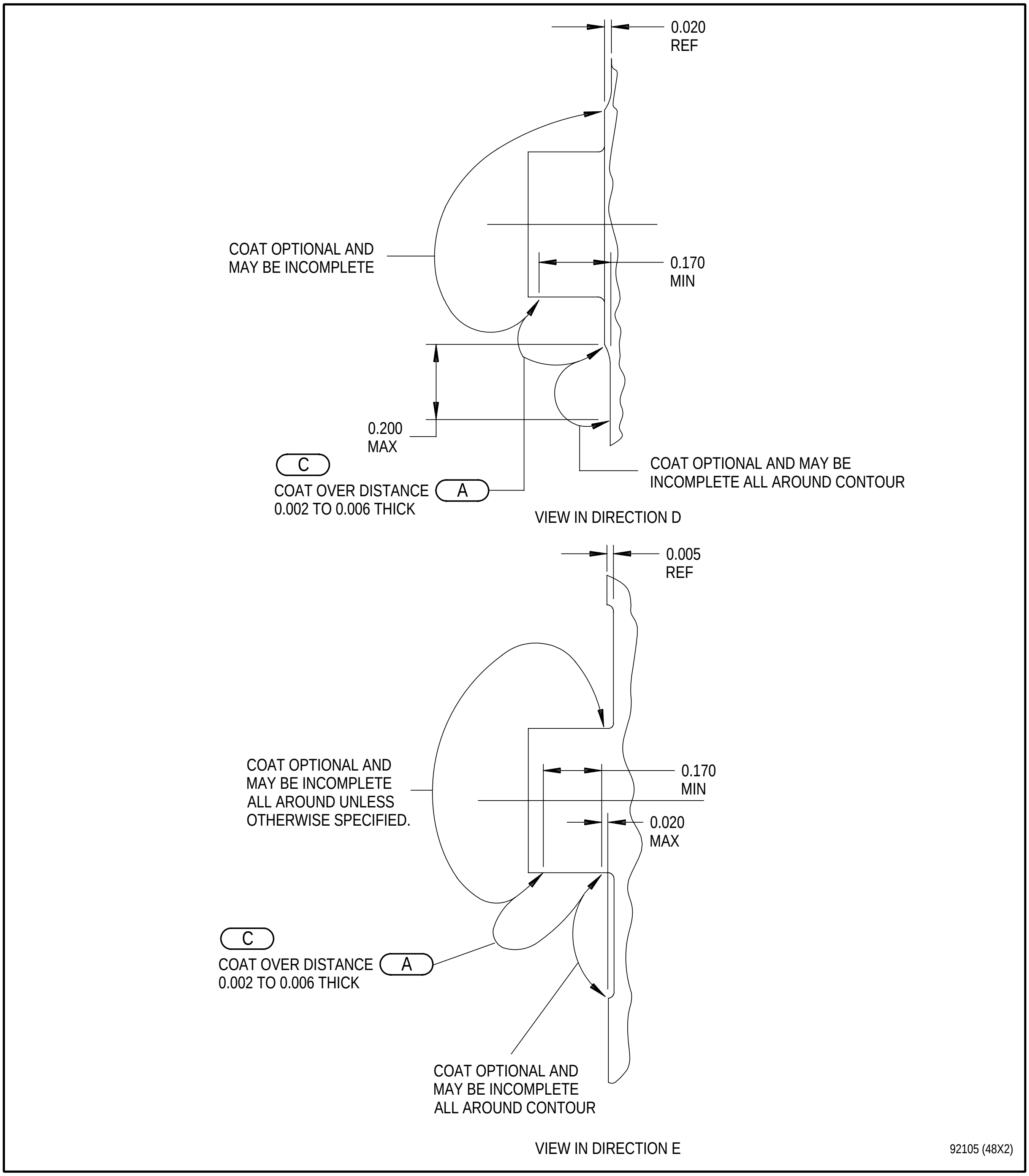


Figure 2. Augmentor Convergent Nozzle Segment - Plasma Coating (Sheet 2 of 2)

4. AUGMENTOR CONVERGENT NOZZLE SEGMENT - BLEND REPAIR.

NOTE

Segment material is PWA 1267, titanium base alloy.

a. Remove nicks, scratches, or pits by blending using fine file and stone. Do not exceed reparable limits per WP 310 00.

b. Blends shall be smooth and continuous. Width-to-depth ratio of blended area shall be 15-to-1.

c. Surface finish of all blends shall be as smooth as adjacent non-grit blasted surface.

d. Fluorescent penetrant inspect blended areas per SPOP 70. No cracks permitted. Refer to T.O. 2-1-111.

e. Clean nozzle segment per SPOP 208, method A or B. Refer to T.O. 2-1-111.

WORK PACKAGE

TECHNICAL PROCEDURES

LINER, AUGMENTOR CONVERGENT NOZZLE SEGMENT -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	9				
2	6				
3 - 7	9				
8 Blank	6				

REFERENCE MATERIAL REQUIRED

Title		Number
Standard Maintenance Procedures	- - - - - - - - - - - - - - - - - -	T.O.2-1-111
Introduction and General Instructions	- - - - - - - - - - - - - -	T.O.2J-F100-53-1
Qualified Repair Source List (QRSL)	- - - - - - - - - - - - - -	WP 600 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
Rivet	AN 123315	3
Rivet	AN 123319	2

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor convergent nozzle segment liner.

2. AUGMENTOR CONVERGENT NOZZLE SEGMENT LINER - HINGE REPLACEMENT.

(See Figure 1.)

a. Place plastic shim stock between rivet removal tool and liner so that liner coating will not be damaged.

b. Remove three rivets in aft hinge with rivet removal tool.

c. Remove hinge.

d. Inspect liner as follows: (see figure 1)

(1) Inspect rivet holes(4). Repair distress task code JGDFGAJ if limit is exceeded. Refer to T.O. 2J-F100-53-1, WP 606 00.

(2) Inspect area around rivet holes(3) for chipping of coating. Repair distress task code JGDFGACIf if limits are exceeded. Refer to T.O. 2J-F100-53-1, WP 606 00.

(3) Inspect backbone(5) in hinge area. Minimum wall thickness shall include coating except around rivet holes where chipping of coating is allowed. Replace liner if limits are exceeded.

(4) Inspect backbone hinge area for cracks using 10X glass. No cracks allowed. Replace liner if cracks are present.

e. Place plastic shim stock between rivet tool and liner so that liner coating will not be damaged.

f. Install PN 4077801-01 replacement hinge assembly using rivets in existing holes. Oversized rivets are not permitted and minimum edge distances are waived. Refer to T.O. 2-1-111.

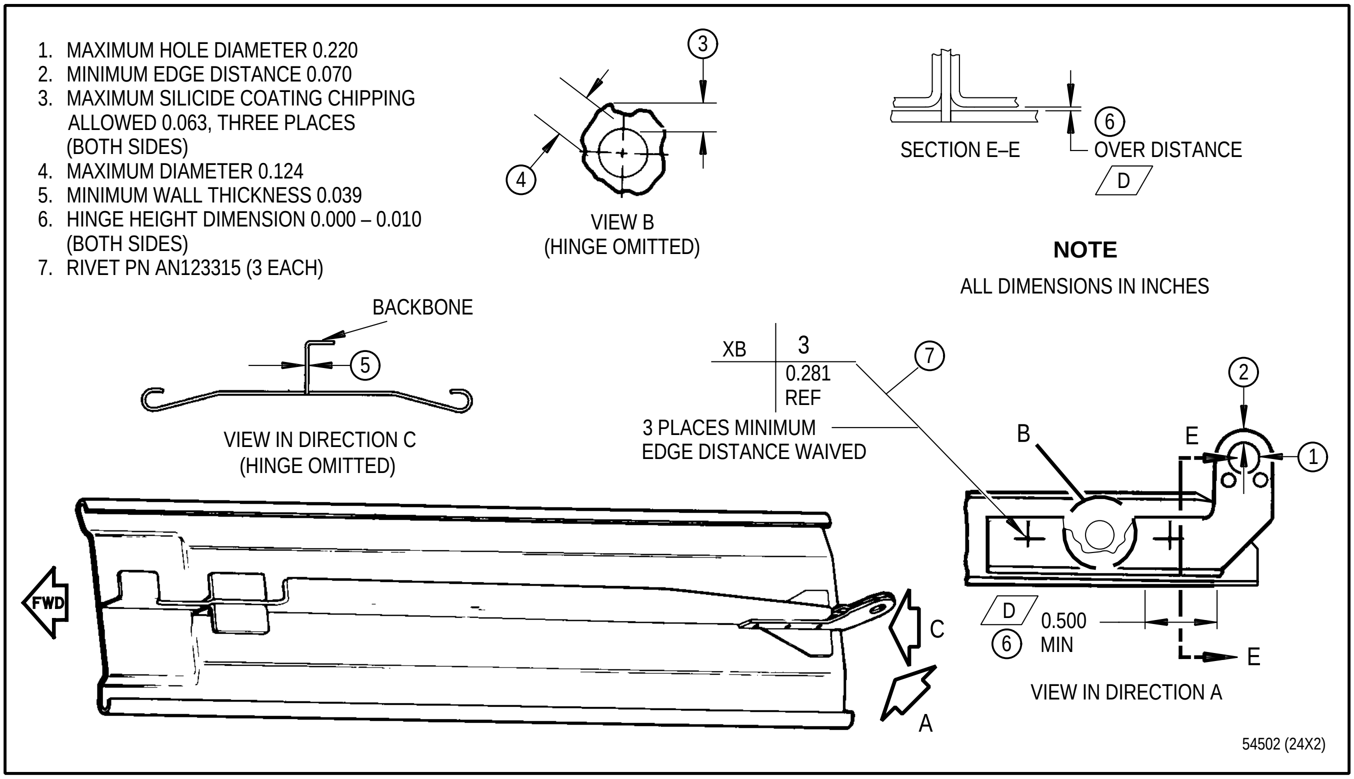


Figure 1. Augmentor Convergent Nozzle Segment Liner - Hinge Replacement

3. AUGMENTOR CONVERGENT NOZZLE SEGMENT LINER - SEAT REPLACEMENT.

(See Figure 2.)

a. Remove two rivets(5) attaching seats(6) to liner. Plastic shim stock may be positioned to protect liner coating during rivet removal. Remove seats.

b. Record liner assembly part number found on old seats and transfer to new seats by vibration peen or shallow electro etch (SPOP 401). Refer to T.O. 2-1-111.

c. Inspect liner rivet holes per dimension(3). If rivet holes exceed maximum diameter, repair distress task code JGDFGAJ at qualified repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

d. Inspect area around rivet holes for chipped silicide coating per dimension(4). If coating damage exceeds 0.063 inch, repair distress task code JGDFGAC at a qualified repair source. Refer to T.O. 2J-F100-53-1, WP 606 00.

e. Position seats(6) on liner taking care not to damage PWA 295 silicide coating one liner. Maintain dimensions(1) and (2).

f. Secure seats(6) using PN AN123319 rivets(5) through existing holes in liners. Oversized rivets are not permitted and minimum edge distances are waived. Refer to T.O. 2-1-111.

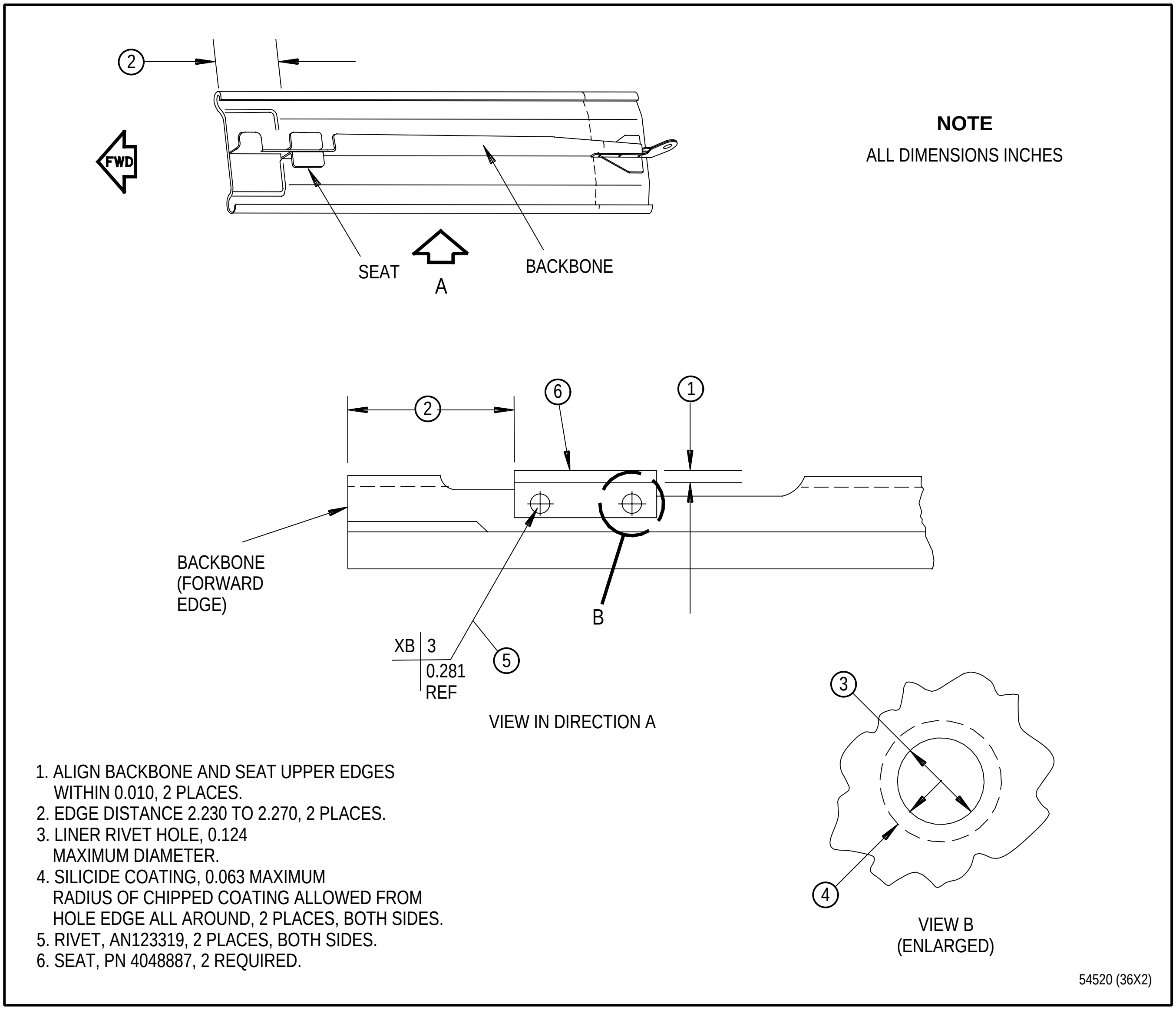


Figure 2. Augmentor Convergent Nozzle Segment Liner - Seat Replacement

4. AUGMENTOR CONVERGENT NOZZLE SEGMENT LINER - REPAIR

a. Repair is proprietary. Refer to T.O. 2J-F100-53-1, WP 606 00 for Qualified Repair Source List (QRSL) by Task Code:

NOTE

The vendor repair procedure list in the QRSL must be kept current by incorporation of all T.O. changes that affect the repaired part. If the vendor procedure listed does not incorporate the T.O. changes then the vendor must submit a procedure revision to Pratt & Whitney for review and update of the procedure/change date listed in the QRSL.

- JGDFGAF Wear at forward end
- JGDFGAD Erosion at aft end
- JGDFGAL Curled edge burn-through
- JGDFGAK Holes worn from finger seal contact
- JGDFGAJ Rivet hole elongation
- JGDFGAC Chipped silicide coating
- JGDFGAG Missing hardcoat
- JGDFGAH Curled edge missing material/erosion
- JGDFGAM Facesheet cracks and thermal erosion
- JGDFGAN Curled edge and trailing edge warpage

WORK PACKAGE

TECHNICAL PROCEDURES

NOZZLE SEGMENT, DIVERGENT, AUGMENTOR -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 50

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	24	5	21	8 - 9	24
2A - 2B	20	6 - 7	20	10 - 30	20
3 - 4	20			31 - 48 Added	20

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - - - - - - - - - - - - - - -	T.O. 2-1-111
Light Duty Cleaning of Titanium Parts (Solvent Cleaning Method and Alkaline Cleaning Methods) - - - - - - - - - - - -	SPOP 208
Standard Fluorescent Penetrant Inspection (Local Application) -	SPOP 70
Solution Heat Treat Cycle 101 - - - - - - - - - - - - - - - - - - -	SPOP 761
Solution Heat Treat Cycle 102 - - - - - - - - - - - - - - - - - - -	SPOP 762
Stabilization Heat Treat Cycle 103 - - - - - - - - - - - - - - -	SPOP 763
Precipitation Heat Treat Cycle 104 - - - - - - - - - - - - - - -	SPOP 764
High Sensitivity Fluorescent Penetrant Inspection - - - -	SPOP 82
Nondestructive Inspection Procedures - - - - - - - - - - - - - - -	T.O. 2J-F100-9
Introduction and General Information - - - - - - - - - - - - - - -	T.O. 2J-F100-53-1
General Repair Procedures - Welding, Inert Gas Fusion - -	SWP 093 01
Qualified Repair Source List (QRSL) - - - - - - - - - - - - - - -	WP 600 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ALCOHOL, ISOPROPYL	TT-I-735 (PMC 9094)
FILLER METAL	AMS 5828
FILLER METAL	AMS 5832
OIL, LUBRICATING, LIGHT	MIL-C-16173, GRADE 3; VALVOLINE, TECTYL 894
STONE, ABRASIVE	FINE

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
RIVET	AN 123336	1
RIVET	AN 123636	1

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
7	AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY - AFT HINGE REPLACEMENT	
	FIXTURE	PWA 71331
	PUNCH	PWA 55829
	WELD FIXTURE	PWA 71332
8	AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY - FORWARD HINGE REPLACEMENT	
	FIXTURE, INSPECTION AUGMENTOR DIVERGENT SEGMENT REPAIR	PWA 55890
	FIXTURE	PWA 71331
	PUNCH	PWA 55829
	WELD FIXTURE	PWA 71332
	FIXTURE	PWA 71335
	DRILL AND REAM FIXTURE	PWA 71333

ILLUSTRATED SUPPORT EQUIPMENT

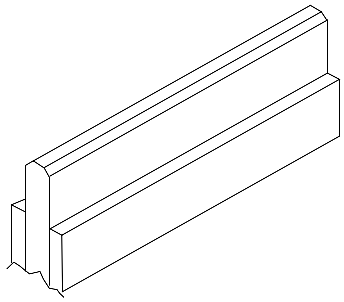

PWA 55829 –C

Figure T1. PWA 55829 PUNCH

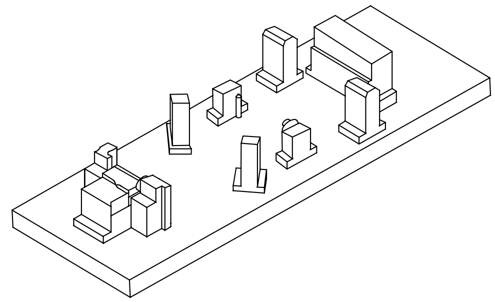

PWA 55890 –C

Figure T2. PWA 55890 FIXTURE

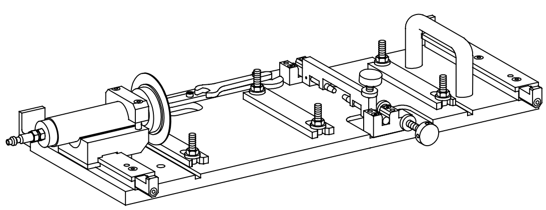

PWA 71331 –C

Figure T3. PWA 71331 FIXTURE

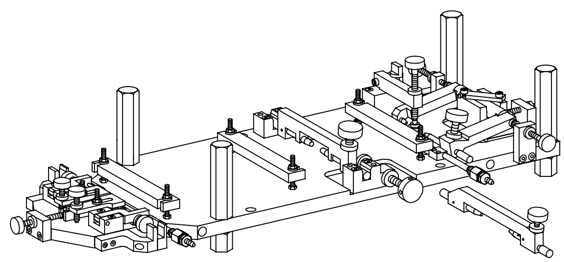

PWA 71332 –C

Figure T4. PWA 71332 WELD FIXTURE

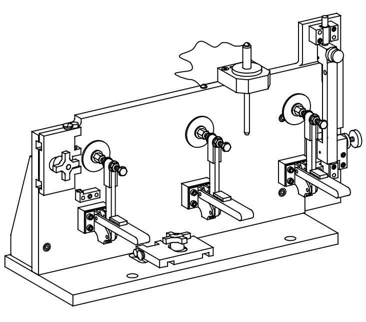

PWA 71333 –C

Figure T5. PWA 71333 DRILL AND REAM FIXTURE

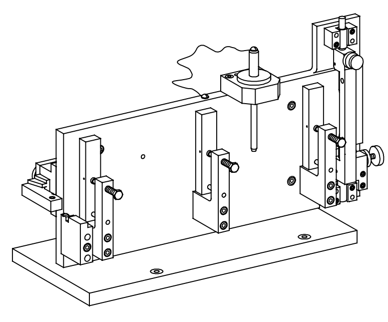

PWA 71335 –C

Figure T6. PWA 71335 FIXTURE

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor divergent nozzle segment.

2. AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY - TRAILING EDGE REPAIR.

(See Figure 1.)

a. Straighten any bends and blend nicks, cracks, and breaks to eliminate jagged contour and projections which may impair sliding contact with divergent seal.

b. Fluorescent penetrant inspect. Refer to T.O. 2-1-111, SPOP 70.

c. Stop drill cracks using 0.109 to 0.141 inch diameter carbide or cobalt drill.

3. AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY, FACESHEET SIDE EDGE - BLEND REPAIR.

(See figure 1.)

a. Blending requirements are as follows:

(1) All local blending shall extend to a distance of at least 15 times depth of damage from center of blend.

(2) Surface finish shall be as smooth or smoother than original finish.

b. Blend repair unserviceable nicks, cuts, and tears up to 0.125 inch in depth after blending as follows:

(1) Use fine stone.

(2) Remove raised metal as required.

(3) Blend damaged area maintaining a minimum radius of 0.150 inch.

c. Fluorescent penetrant inspect. Refer to T.O. 2J-F100-9. No cracks permitted.

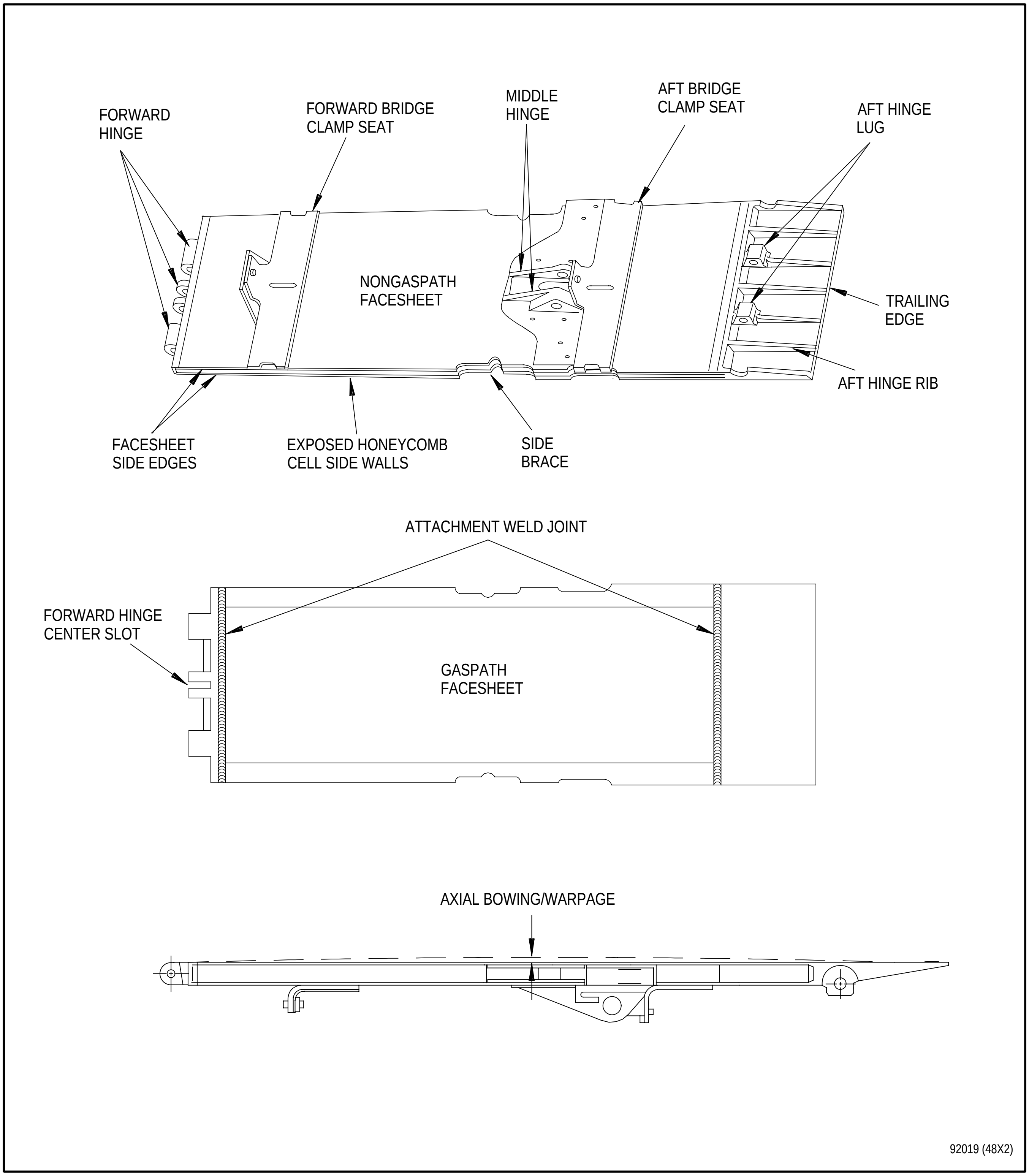


Figure 1. Augmentor Divergent Nozzle Segment Assembly - Repair

4. AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY - AFT HINGE HOLE WEAR, WELD REPAIR.

(See Figure 2.)

a. Remove forward and aft bridge clamp seats per paragraph 5.

b. Solution heat treat segment per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for one hour. Refer to T.O. 2-1-111.

c. Clean areas to be welded. Refer to T.O. 2J-F100-53-1, SWP 093 01.

d. Plug weld as required using tungsten inert gas fusion weld (GTAW) and AMS 5828 filler material. Restrain trailing end with fixture incorporating chill block to absorb heat. Refer to T.O. 2J-F100-53-1, SWP 093 01.

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

e. Fluorescent penetrant inspect welded area. Refer to T.O. 2-1-111, SPOP 70. No cracks permitted. Do not allow penetrant to enter honeycomb core.

f. Place part on flat heat-treat spider with flat (gaspath) side down.

g. Solution heat treat per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for one hour. Refer to T.O. 2-1-111. Stabilization heat treat using argon or vacuum atmosphere. Refer to SPOP 763, cycle 103, in T.O. 2-1-111. Precipitation heat treat using argon or vacuum atmosphere. Refer to SPOP 764, cycle 104, in T.O. 2-1-111. No hardness impression permitted on honeycomb.

h. Machine diameters (1) and (2) and dimensions (3), (4), (5), and (6) as required. Welds must be flush to 0.010 inch above adjacent surfaces.

i. Fluorescent penetrant inspect machined areas. Refer to T.O. 2-1-111, SPOP 70. No cracks permitted.

j. Install serviceable seats or install new seats per paragraph 5.

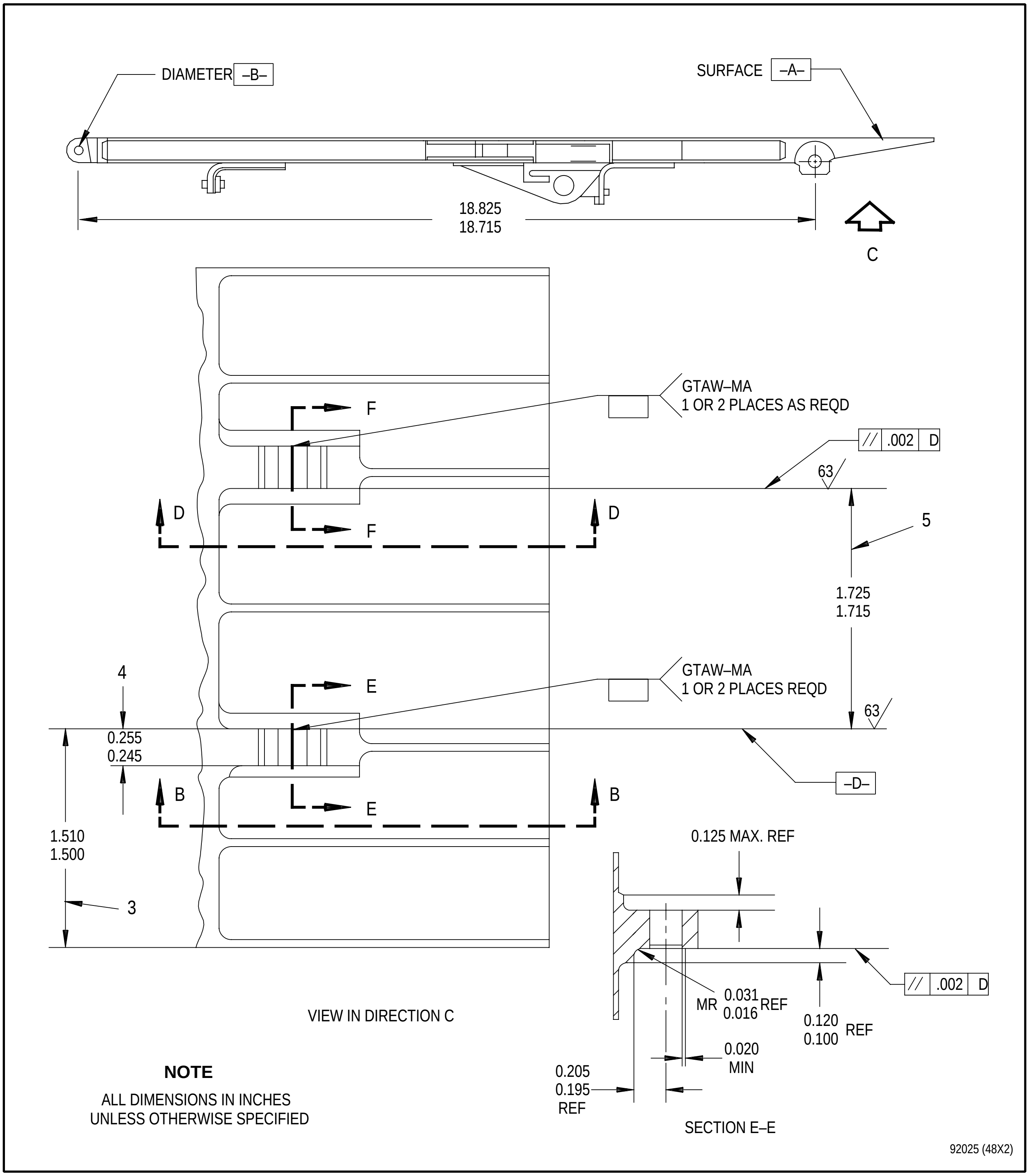


Figure 2. Augmentor Divergent Nozzle Segment Assembly - Aft Hinge Hole Wear Repair (Sheet 1 of 2)

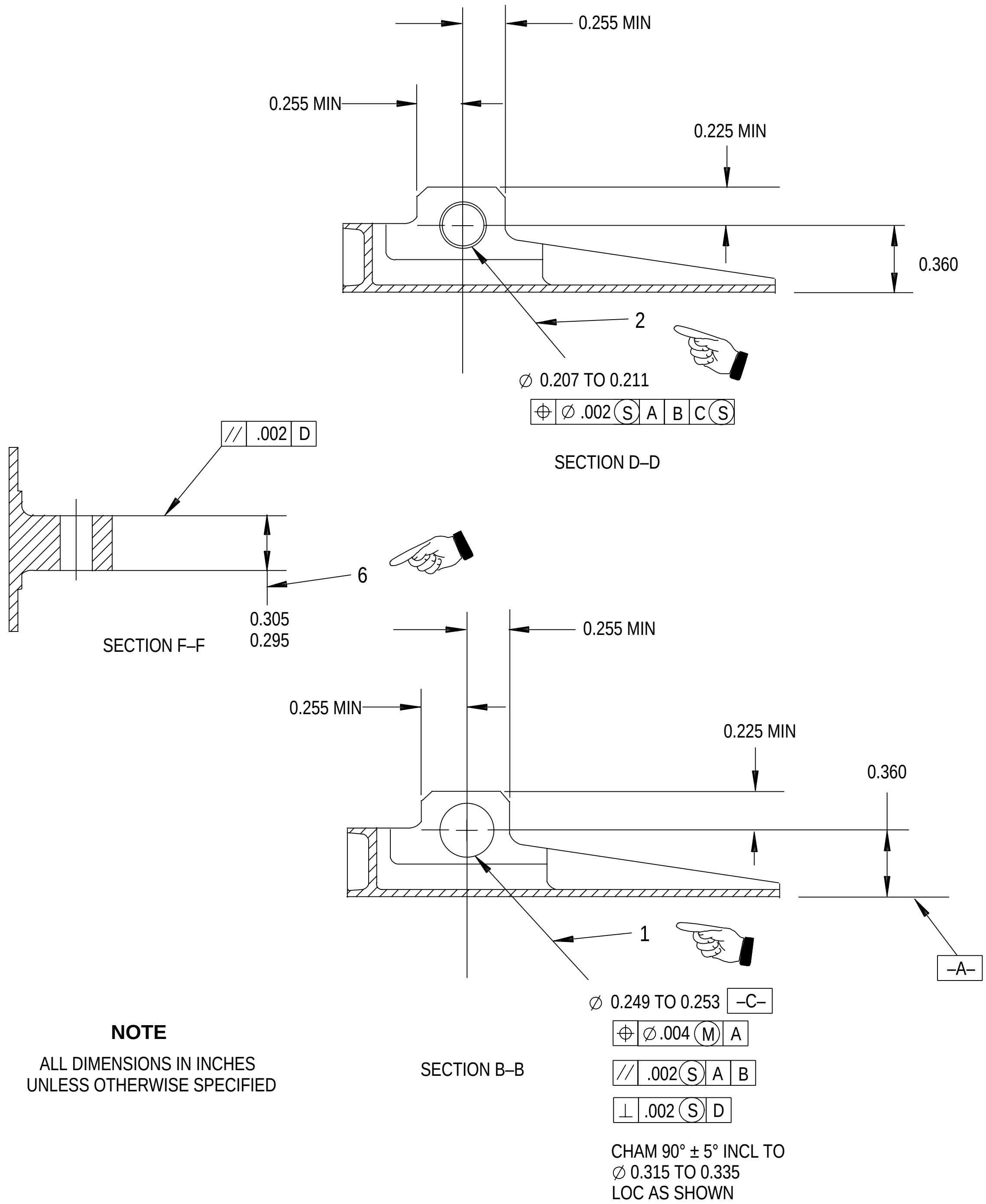


Figure 2. Augmentor Divergent Nozzle Segment Assembly - Aft Hinge Hole Wear Repair (Sheet 2 of 2)

5. AUGMENTOR DIVERGENT SEGMENT ASSEMBLY FORWARD AND AFT BRIDGE CLAMP SEATS - REPLACEMENT.
(See figure 1.)

NOTE

Shank of rivet may be removed using No. 35 drill, as necessary.

a. Grind bucked head of retainer or hinge rivet. Remove rivet. Refer to T.O. 2-1-111.

b. Remove seat.

c. Install new or serviceable seat onto divergent nozzle seal clamp seat retainer (forward) or augmentor divergent nozzle segment mid-hinge (aft). Ensure seat is flush to retainer or hinge.

d. Transfer drill rivet hole from retainer or hinge to seat using cobalt drill. Refer to T.O. 2-1-111.

NOTE

Forward seat uses PN AN123336 rivet; aft seat uses PN AN123636 rivet.

e. Rivet seat to retainer or hinge per T.O. 2-1-111.

6. AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY - THERMAL BARRIER COATING REPAIR.
(See Figure 3.)

NOTE

- PWA 265 is preferred coating.
- Application of PWA 265 is source demonstration repair. Send parts to approved source for repair. Approved source list can be obtained by contacting USAF F100 Engineering Source Authority at address list in qualified repair source list (QRSL) located in T.O. 2J-F100-53-1, WP 600 00.
- Critical nature of this repair requires each facility intending to accomplish repair to contact USAF F100 Engineering Source Authority at address listed in QRSL to obtain information on becoming approved source.
- Plasma spray coating for USAF components shall be worked in accordance with approved depot process order or approved plasma spray plan per LPF-QPR-007. Approval shall be required by cognizant engineering office for specific engine component.
- For specific information on masking, plasma coat removal, PWA 53-33, and PWA 265 coating application, refer to T.O. 2-1-111.

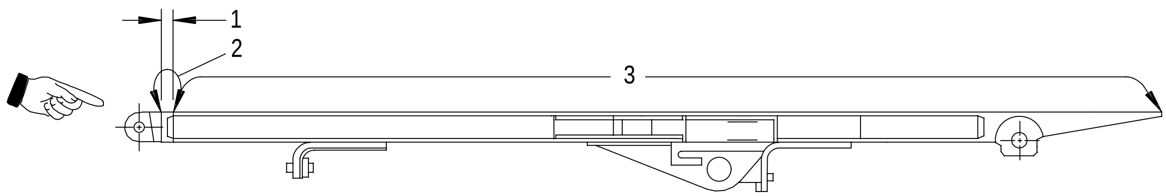
a. Prepare area to be coated as shown. See figure 3. Refer to T.O. 2-1-111.

NOTE

Time between surface preparation and application of coating material shall be as brief as practicable, preferably within two hours.

b. Plasma spray area per PWA 53-33, PWA 265, or SA-ALC 46/204. Total thickness 0.008 to 0.010 inch.

c. Remove masking and residual masking adhesive from divergent segment.



1. 0.250 inch maximum to coat area
2. Coating optional and may be incomplete
3. Coat per PWA 53-33, PWA 265, or SA-ALC 461/204 where shown. Total thickness 0.008 to 0.010 inch

Figure 3. Augmentor Divergent Nozzle Segment Assembly - Thermal Barrier Coating Repair

7. AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY - AFT HINGE REPLACEMENT.
(See Figures 4 through 6.)

a. Inspect augmentor divergent nozzle segment assembly per WP 314 00.

b. Remove forward and aft bridge clamp seats per paragraph 5.

CAUTION

Chemical removal of coating is prohibited. Chemicals could become trapped in honeycomb, causing corrosion of weld joints.

c. Remove hard coating per T.O. 2-1-111.

d. Ultrasonically clean nozzle segment assembly with isopropyl alcohol for 30 minutes minimum. Drain thoroughly.

e. Bake at 300° to 350°F (149° to 177°C) for 30 minutes minimum.

f. Place part on flat heat-treat spider with flat side down.

g. Solution heat treat segment per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for one hour. Refer to T.O. 2-1-111.

NOTE

When removing both forward and aft hinge details, set fixture up to remove forward hinge detail first.

h. Set up PWA 71331 fixture as follows: (See figure 4.)

(1) Remove fixture from storage, wipe clean, and place on clean flat work surface. Inspect for missing details or imperfections which may impact tool function.

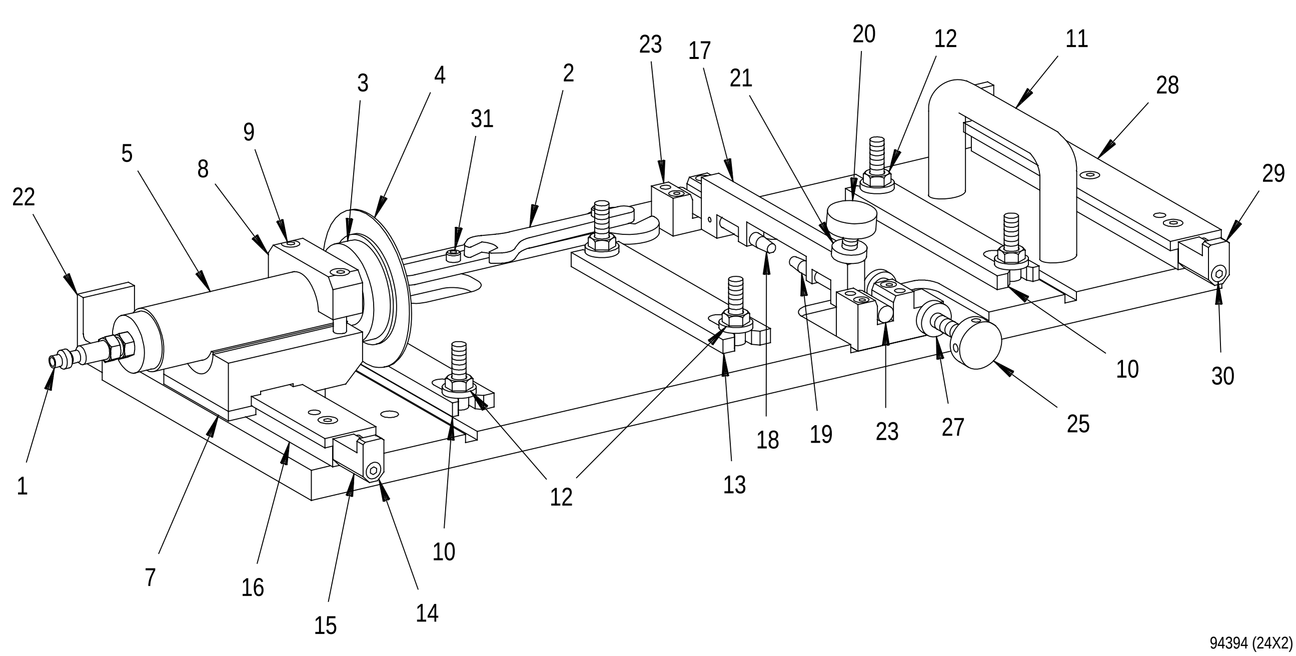


Figure 4. Aft Hinge Replacement - Hinge Removal Fixture (Sheet 1 of 4)

(2) Use 3/16 inch allen wrench to remove two handles(11). Set handles aside.

(3) Use 11/16 inch box end wrench to loosen six flange nuts(12) and remove two end clamps(10) and center clamp(13).

NOTE

When removing aft hinge detail, air motor assembly is removed from forward or aft rail(16 or 28) and set aside until divergent segment has been loaded.

(4) Remove air motor assembly from forward or aft rail(16 or 28) by loosening socket head cap screw(14 or 30) and rotating end stop(15 or 29) 180 degrees.

(5) Put drop of light oil into air motor end connection(1) for motor lubrication. Set air motor assembly aside.

(6) Install mid hinge locator assembly, consisting of jam nut(21), knurled head screw(20), adjustable locator pin(19), fixed locator pin(18), and locating pin frame(17), into divergent segment mid hinge hole as follows:

(a) Loosen jam nut(21) and knurled head screw(20) and retract the adjustable locator pin(19).

(b) Install tapered end of fixed locator pin(18) into divergent segment mid hinge 0.315 inch diameter hole.

(c) Push adjustable pin into opposite mid hinge hole and secure in place by tightening knurled screw and jam nut.

NOTE

Dimensions for removal and replacement of aft hinge include 0.010 inch weld shrinkage allowance and 0.0005 inch/inch heat treat shrinkage allowance where applicable.

i. Remove aft hinge per View H, dimension (12 and 13, figure 6), by cutting with PWA 71331 fixture as follows:

(1) Install divergent segment into fixture by locating mid hinge locator pin trunnions into U-blocks(23, figure 4). Inside edge of outboard lug on divergent segment(32) should contact 0.1875 inch diameter locator pin(24) per figure 4, sheet 3.

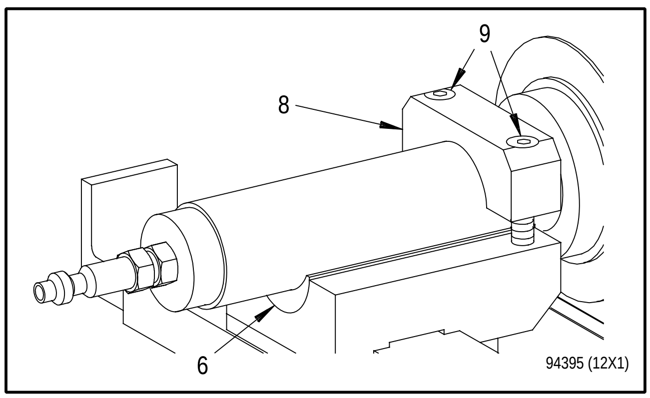


Figure 4. Aft Hinge Replacement - Hinge Removal Fixture (Sheet 2 of 4)

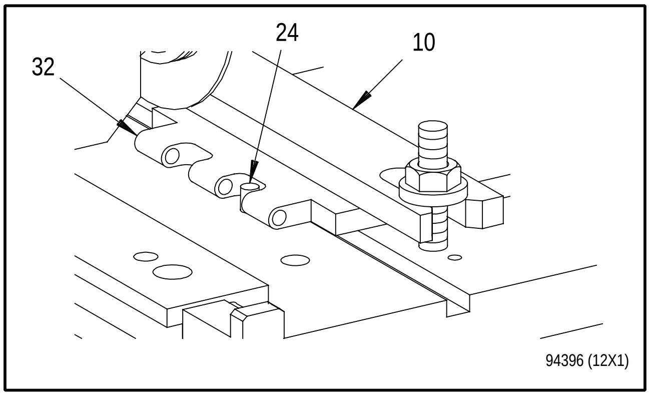


Figure 4. Aft Hinge Replacement - Hinge Removal Fixture (Sheet 3 of 4)

(2) Install two end clamps(10), marking side up, and center clamp(13) and finger-tighten six flange nuts(12).

(3) Adjust knurled screw(25) until divergent segment face contacts 0.500 inch diameter locator pin(26) per figure 4, sheet 4. Secure with knurled screw(25) and knurled check nut(27).

(4) Secure divergent segment flat against fixture base by evenly tightening six flange nuts.

(5) Loosen socket head cap screw(30) and rotate end stop(29) 180 degrees.

(6) Inspect aft rail(28) and slide(7) for any signs of burrs or corrosion. Wipe rails and bottom of air motor assembly and lubricate with light oil.

(7) Install air motor assembly onto aft rail with cut-off wheel facing inboard. Secure to rail by rotating end stop 180 degrees and tightening socket head cap screw.

(8) Change cut-off wheel(4), when necessary, as follows:

(a) Ensure air supply is disconnected from air motor end connection(1).

(b) Use wrench(2) to remove air motor flange(3) nut, outer blotter, and outer flange detail.

(c) Remove old cut-off wheel, inner back-up flange, and inner blotter.

(d) Inspect both flanges and blotters for signs of fatigue or rubbing. Replace flanges and/or blotters as required.

(e) Reinstall inner blotter and flange, stepped face out, onto threaded spindle.

(f) Install new cut-off wheel, outer flange (stepped face in), and blotter onto spindle.

CAUTION

Over tightening of flange nut may deform flanges and cut-off wheel and damage divergent segment when making hinge cuts.

(g) Thread air motor flange nut hand tight against outer blotter. Snug flange nut using wrenches(2). Do not over tighten as flanges and cut-off wheel may be deformed.

(9) Align air motor(5) and cut-off wheel(4) with fixture as follows:

(a) Loosen two socket head cap screws(9) and remove clamp and air motor.

(b) Put spacer(6) into slide(7) with concave side of spacer up. See figure 4, sheet 2.

(c) Put air motor onto spacer with control handle up and air motor end connection(1) outboard of base.

(d) Put clamp(8) over air motor just behind cut-off wheel guard and hand-secure using two socket head cap screws(9).

(e) Use a 0.125 inch shim to set inner face of cut-off wheel at 0.125 inch from indicated side of end clamp.

(f) When gap is correct, secure air motor to slide with two screws(9).

(10) Ensure air supply is clean and dry and is regulated to 90 psi. Install air supply hose onto end connection(1).

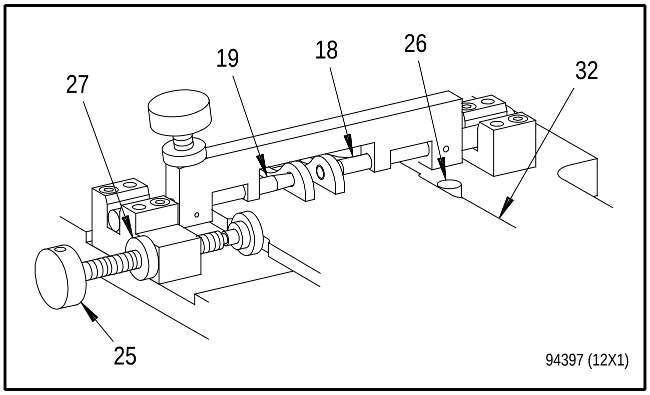


Figure 4. Aft Hinge Replacement - Hinge Removal Fixture (Sheet 4 of 4)

Legend for figure 4

1. End connection
2. Wrenches
3. Flange
4. Cut-off wheel
5. Air motor
6. Spacer
7. Slide
8. Clamp
9. Socket head cap screw
10. End clamp
11. Handle
12. Flange nut
13. Center clamp
14. Socket head cap screw
15. End stop
16. Forward rail
17. Locating pin frame
18. Fixed locator pin
19. Adjustable locator pin
20. Knurled head screw
21. Jam nut
22. Fixed stop
23. U block
24. 0.1875 inch diameter locator pin
25. Knurled screw
26. 0.500 inch diameter locator pin
27. Knurled check nut
28. Aft rail
29. End stop
30. Socket head cap screw
31. Storage screw
32. Divergent segment

CAUTION

To prevent fluid entrapment in honeycomb, all finishing shall be done dry.

(11) Begin removing divergent segment aft hinge panel by pushing cut-off wheel across segment. Use constant force and motor rpm while pushing cut-off wheel across segment. All finishing shall be done dry to prevent entrapment of fluids in honeycomb.

(12) Disconnect air supply hose from motor.

(13) Align cut-off wheel per step i.(9) except remove spacer(6).

(14) Reconnect air supply hose and complete removing aft hinge panel by pushing cut-off wheel across segment as before.

(15) Disconnect air supply hose from motor.

(16) Loosen two cap screws and replace spacer between slide and bottom of air motor.

(17) Remove two end clamps(10) and center clamp(13) details. Remove machined divergent segment and mid locator assembly from fixture U-blocks. Remove mid locator assembly from divergent segment.

j. Deburr finished end of panel K. Deburr both edges of both facesheets.

k. Prepare panel K for welding per View J. Use PWA 55829 punch to depress core from face sheet to dimension(14, figure 6). Use handgrinder to remove all traces of core material from face sheets(15).

l. Use PWA 71332 weld fixture to position panel K and aft hinge(11) as follows:

(1) Prepare fixture as follows:

(a) Remove fixture from storage container, wipe clean, and place on clean, flat work surface, shorter jig feet down.

(b) Inspect fixture for missing details or imperfections which may impact tool function.

(c) Remove three clamps(1, figure 5) and retract five knurled screws(2).

(2) If replacing only aft hinge, go to step (3), otherwise, if replacing both forward and aft hinge panels, accomplish the following:

(a) Install mid locator assembly(3) into mid hinge holes by retracting adjustable pin(4) and inserting fixed pin(5) into one mid hinge hole.

(b) Push adjustable pin into other mid hinge hole and secure with knurled screw(6) and knurled check nut(7).

(3) If replacing only aft hinge panel(11, figure 6), accomplish the following:

(a) Install forward locator assembly(8, figure 5) into forward hinge holes by retracting adjustable pin(4) and inserting the fixed pin(5) into 0.190 inch diameter hole.

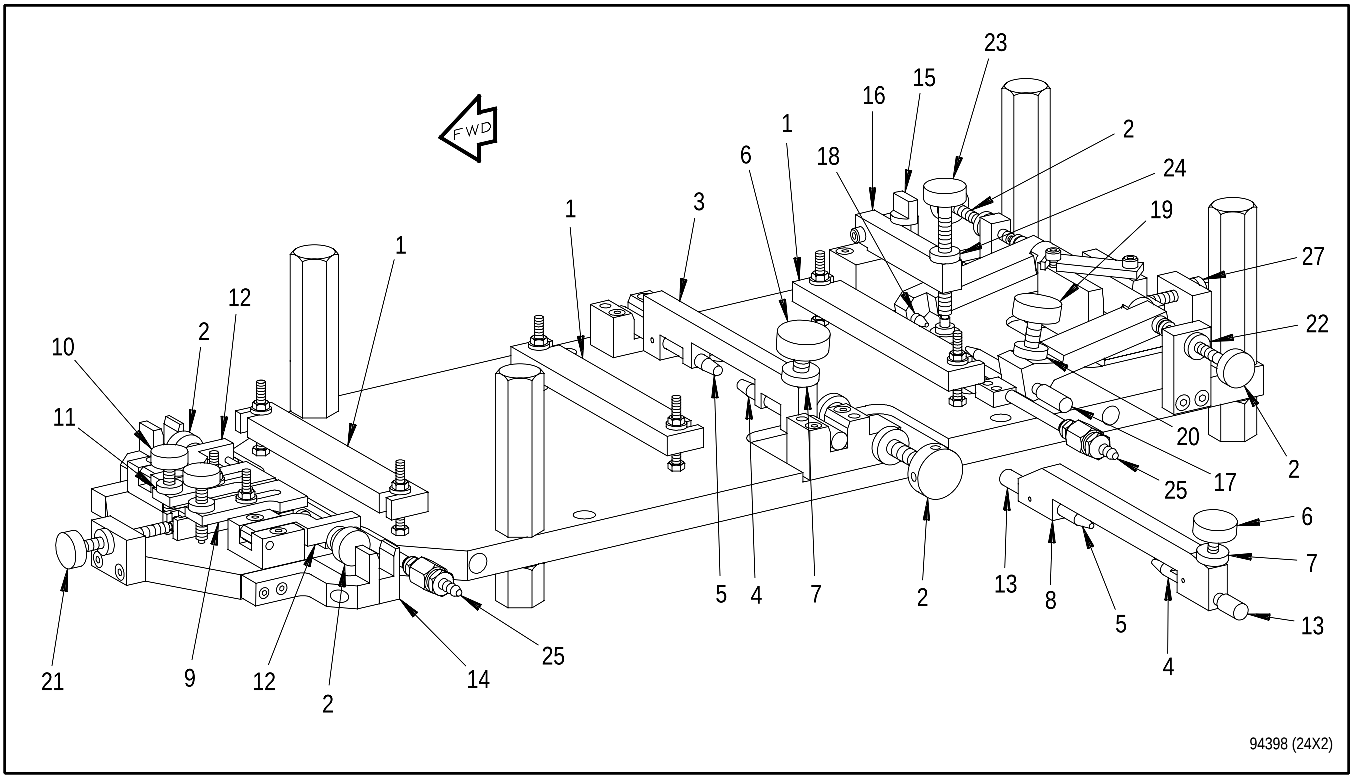


Figure 5. Aft Hinge Replacement - Weld Fixture (Sheet 1 of 3)

(b) Push adjustable pin into opposite end hinge hole and secure with knurled screw(6) and knurled check nut(7).

(4) If replacing either aft only or both hinge panels, accomplish the following:

(a) Retract forward clamp(9) details two places and secure in place with two knurled screws(10) and jam nuts(11).

(b) Swing guide arms(12) out of way and install divergent segment (cut off at aft hinge) onto fixture base, gaspath face down. If forward locator assembly is installed, position trunnions(13) into blocks(14). If mid locator assembly is installed, position trunnions into mid locator blocks.

(c) Loosen knurled check nut and use knurled screw(2, figure 5, sheet 2) to position divergent segment(30) against 0.500 inch diameter locator pin(26). Tighten check nut to secure segment in place.

(d) Rotate half-turn screw(15) 180 degrees and raise clamp arm(16).

(e) Retract aft locator arm assembly adjustable pin(17) and install replacement aft hinge detail(11, figure 6), gaspath face down, 0.200 inch diameter hole into aft locator arm assembly fixed pin(18, figure 5).

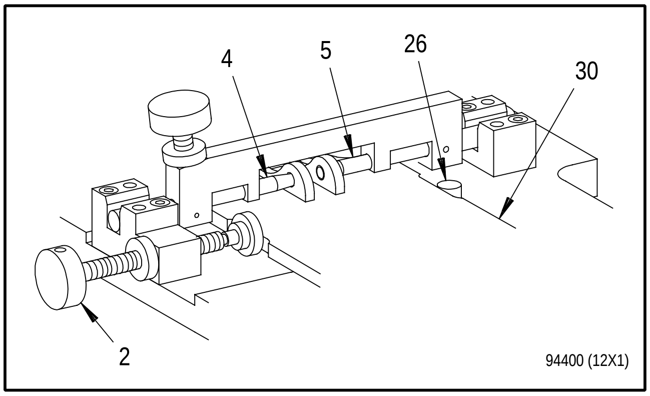


Figure 5. Aft Hinge Replacement - Weld Fixture (Sheet 2 of 3)

(f) Push adjustable pin into aft hinge panel 0.250 inch diameter hole and secure with knurled screw(19) and knurled check nut(20).

(g) Lower assembly until aft hinge detail is flat against fixture base. If aft hinge panel will not fit, raise divergent segment slightly and lower hinge and segment together. If parts still do not fit, retract aft locator slide assembly outward 0.020 inch using knurled screw(27). If parts still do not fit, remove divergent segment and accomplish steps (h) through (j). If parts fit, go to step (k).

CAUTION

To prevent fluid entrapment in honeycomb, all finishing shall be done dry.

(h) Finish aft end of panel K to meet dimension(9, figure 6) per View G. Measure with PWA 71332 weld fixture as required and use PWA 71331 fixture to machine panel. All finishing shall be done dry to prevent entrapment of fluids in honeycomb.

(i) Deburr finished end of panel K. Deburr both edges of both facesheets.

(j) Prepare panel K for welding per View J. Use PWA 55829 punch to depress core from face sheet to dimension(14). Use handgrinder to remove all traces of core material from face sheets(15). Repeat step (g).

(k) Inspect for proper dimension(9) per View G. If dimension(9) is not acceptable, remove divergent segment and go to step (h).

(l) Use GO/NO-GO gage and two knurled screws(2, figure 5, sheet 3) to adjust aft hinge panel side to side per requirements of figure 6. Secure in place with jam nuts(22, figure 5).

(m) Lower clamp arm(16) and tighten half-turn screw(15). Secure aft panel in place with knurled screw(23) and jam nut(24).

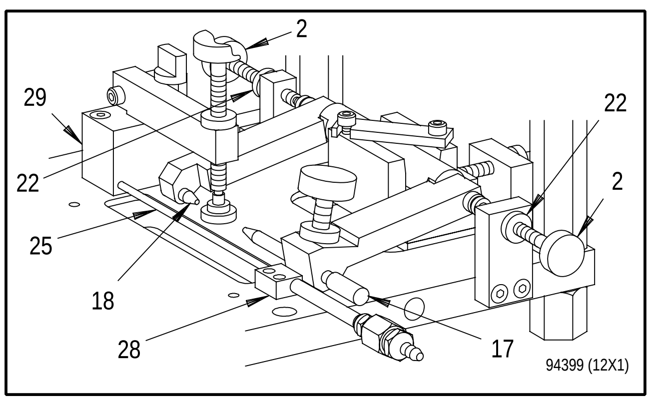


Figure 5. Aft Hinge Replacement - Weld Fixture (Sheet 3 of 3)

Legend for figure 5

1. Clamp
2. Knurled screw
3. Mid locator assembly
4. Adjustable pin
5. Fixed pin
6. Knurled screw
7. Knurled check nut
8. Forward locator assembly
9. Forward clamp
10. Knurled screw
11. Jam nut
12. Guide arm
13. Trunnion
14. Block
15. Half-turn screw
16. Clamp arm
17. Aft locator arm assembly adjustable pin
18. Aft locator arm assembly fixed pin
19. Knurled screw
20. Knurled check nut
21. Knurled screw
22. Jam nuts
23. Knurled screw
24. Jam nut
25. Argon gas purge tube
26. 0.500 inch diameter locator pin
27. Knurled screw
28. Guide block
29. Support block
30. Divergent segment

(n) Install argon gas purge tube(25) through guide block(28) 0.188 inch diameter hole and thread into support block(29) 0.125 inch diameter hole. Connect gas purge supply to hose barb fitting of argon tube(25).

m. Prior to welding, wipe panel K, aft hinge(11, figure 6), and PWA 71332 weld fixture, clean with isopropyl alcohol. Refer to T.O. 2-1-111, SPOP 208, Method A.

n. Use PWA 71332 weld fixture to weld new aft hinge to panel K as follows:

(1) Tack aft hinge panel weld joint in place. Refer to T.O. 2-1-111. No undercut or underfill is permitted. Use argon purge tube of weld fixture. Parent material of aft hinge is AMS 5706, honeycomb gaspath facesheet is AMS 5544 and non-gaspath facesheet is AMS 5596. Use AMS 5832 filler metal.

(2) Turn fixture over and tack weld back side of weld joint as above.

(3) Loosen jam nut(11, figure 5) and forward locator adjustable pin(4). Remove forward locator assembly(8) by pushing locator support toward fixed pin(5) and sliding adjustable pin(4) free from forward hinge hole.

(4) Rotate half-turn screw(15) 180 degrees and raise clamp arm(16). Loosen knurled check nut(20) and knurled screw(19) and retract adjustable pin(17).

(5) Loosen both jam nuts(22) and adjust two knurled screws(2) until aft locator assembly is free from aft hinge holes.

(6) Lower clamp arm and secure with half-turn screw. Adjust knurled screw(23) until screw clamp pad loosely contacts aft hinge back face. Loosen, but do not remove, three clamps(1).

(7) Finish welding aft hinge joint. Refer to T.O. 2-1-111. No undercut or underfill is permitted. Use argon purge tube of weld fixture. Parent material of aft hinge is AMS 5706, honeycomb gaspath facesheet is AMS 5544 and non-gaspath facesheet is AMS 5596. Use AMS 5832 filler metal.

o. Remove welded divergent segment when cool. Remove mid locator assembly, if installed. Inspect Surface F for required profile and flatness and straighten if necessary.

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

p. Optional to local fluorescent penetrant inspect weld and heat affected areas to SFPS 38. Refer to SPOP 70 in T.O. 2-1-111. No cracks permitted. Do not allow penetrant to enter honeycomb core.

q. Ultrasonically clean divergent segment assembly with isopropyl alcohol for 30 minutes minimum. Drain thoroughly. Cover part after cleaning to prevent contamination.

r. Bake at 300° to 350°F (149° to 177°C) for 30 minutes minimum.

s. Place part on flat heat-treat spider with flat side down.

t. Solution heat treat segment per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for one hour. Refer to T.O. 2-1-111.

u. Optional to radiographic inspect welds, Level 2T, to SXRS 33. Refer to T.O. 2-1-111. No cracks permitted.

v. Place part on flat heat-treat spider with flat side down.

w. Stabilization heat treat per SPOP 763, cycle 103, using argon atmosphere. Refer to T.O. 2-1-111. Precipitation heat treat per SPOP 764, cycle 104, using argon atmosphere. Refer to T.O. 2-1-111. No hardness impressions permitted on honeycomb.

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

x. Local fluorescent penetrant inspect weld and heat affected areas to SFPS 38. Refer to SPOP 70 in T.O. 2-1-111. No cracks permitted. Do not allow penetrant to enter honeycomb core.

y. Radiographic inspect welds, Level 2T, to SXRS 33. Refer to T.O. 2-1-111. No cracks permitted.

z. Wipe entire part clean with isopropyl alcohol. Refer to T.O. 2-1-111, SPOP 208, Method A. Cover part after cleaning to prevent contamination.

aa. Coat per paragraph 6.

ab. Install forward and aft bridge clamp seats per paragraph 5.

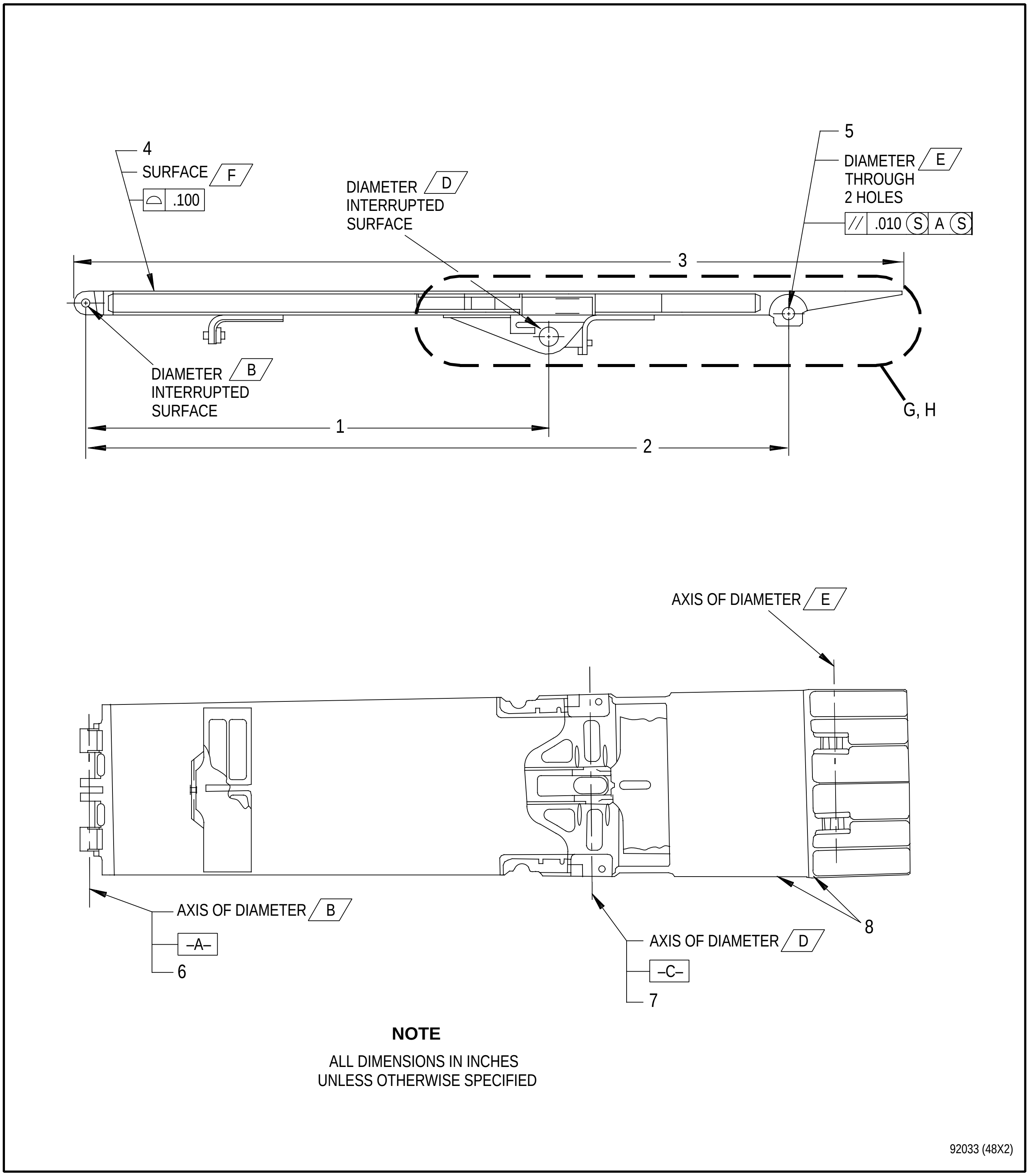


Figure 6. Augmentor Divergent Nozzle Segment Assembly (Typical PN 4071142) - Aft Hinge Replacement (Sheet 1 of 2)

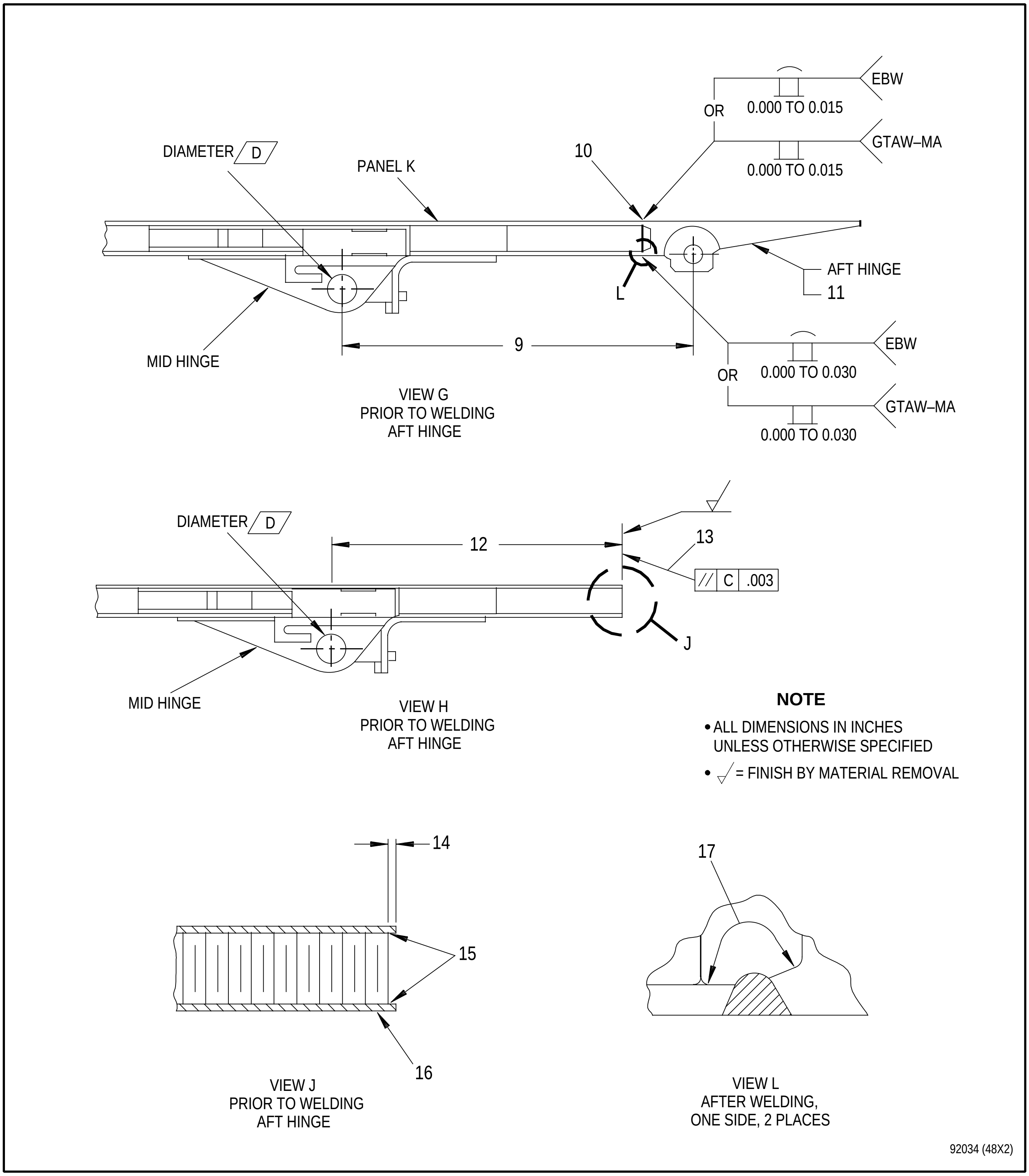


Figure 6. Augmentor Divergent Nozzle Segment Assembly (Typical PN 4071142) - Aft Hinge Replacement (Sheet 2 of 2)

Legend for figure 6

1. 12.678 inches
2. 18.715 to 18.825 inches
3. Gaspath side surface length from aft hinge end to forward hinge radius tangency point
4. Profile of Surface F shall be within 0.100 inch. Flatness within profile limits shall not exceed 0.015 inch/inch for distance (3).
5. Axis of Diameter E must be parallel to Datum A within 0.010 inch.
6. Datum A is the Axis of Diameter of B.
7. Datum C is the Axis of Diameter of D.
8. In common plane within 0.020 inch total, both sides
9. 6.095 to 6.115 inches. Allows for 0.010 inch weld shrinkage and 0.003 inch for heat treat shrinkage.
10. Clamped tightly, no gap
11. Aft hinge, PN 4071143
12. 5.380 to 5.400 inches
13. Parallel to Datum C within 0.003 inch
14. 0.020 to 0.070 inch after dressing core
15. Grind to remove core material from face sheets
16. Permissible to prepare face sheets for weld. 0.022 inch minimum wall thickness must be maintained.
17. For distance shown, inside surfaces of both aft hinge and face sheets shall be smooth and continuous after welding.

8. AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY - FORWARD HINGE REPLACEMENT.
(See Figures 7 through 11.)

a. Inspect augmentor divergent nozzle segment assembly per WP 314 00. PWA 55890 inspection fixture may be used to inspect certain features, if desired.

b. Remove forward and aft bridge clamp seats per paragraph 5.

CAUTION

Chemical removal of coating is prohibited. Chemicals could become trapped in honeycomb, causing corrosion of weld joints.

c. Remove hard coating per T.O. 2-1-111.

d. Ultrasonically clean nozzle segment assembly with isopropyl alcohol for 30 minutes minimum. Drain thoroughly.

e. Bake at 300° to 350°F (149° to 177°C) for 30 minutes minimum.

f. Place part on flat heat-treat spider with flat side down.

g. Solution heat treat segment per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for one hour. Refer to T.O. 2-1-111.

NOTE

When removing both forward and aft hinge details, set fixture up to remove forward hinge detail first.

h. Set up PWA 71331 fixture as follows: (See figure 7.)

(1) Remove fixture from storage, wipe clean, and place on clean flat work surface. Inspect for missing details or imperfections which may impact tool function.

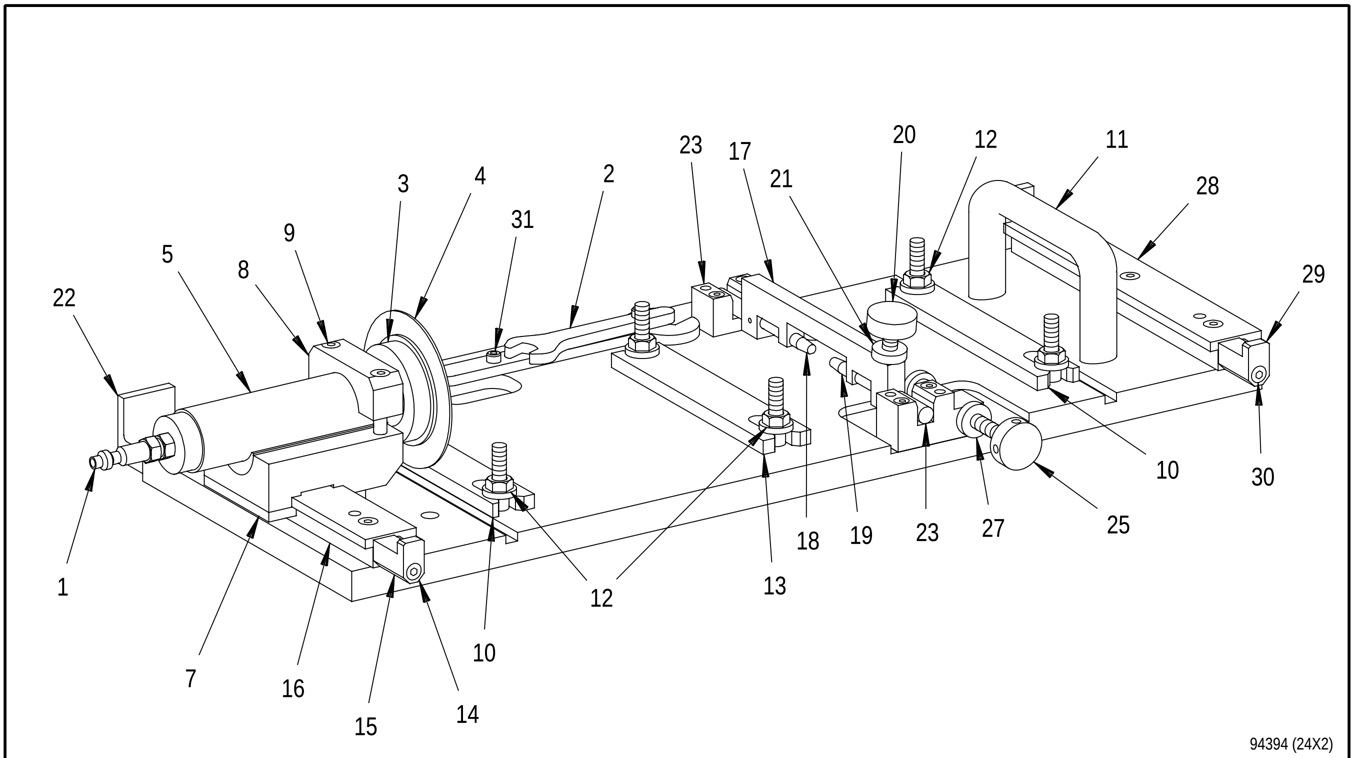


Figure 7. Forward Hinge Replacement - Hinge Removal Fixture (Sheet 1 of 4)

(2) Use 3/16 inch allen wrench to remove two handles(11). Set handles aside.

(3) Use 11/16 inch box end wrench to loosen six flange nuts(12) and remove two end clamps(10) and center clamp(13).

(4) Remove air motor assembly from forward or aft rail by loosening socket head cap screw(14 or 30) and rotating end stop(15 or 29) 180 degrees.

(5) Inspect forward rail(16) and slide(7) for any signs of burrs or corrosion. Wipe rails and bottom of air motor assembly and lubricate with light oil.

(6) Put drop of light oil into air motor end connection(1) for motor lubrication. Set air motor assembly aside.

(7) Install mid hinge locator assembly, consisting of jam nut(21), knurled head screw(20), adjustable locator pin(19), fixed locator pin(18), and locating pin frame(17), into divergent segment mid hinge hole as follows:

(a) Loosen jam nut(21) and knurled head screw(20) and retract the adjustable locator pin(19).

(b) Install tapered end of fixed locator pin(18) into divergent segment mid hinge 0.315 inch diameter hole.

(c) Push adjustable pin into opposite mid hinge hole and secure in place by tightening the knurled screw and jam nut.

NOTE

- When removing forward hinge detail, air motor assembly is loaded onto forward rail(16) and slid against fixed stop(22).
- Dimensions for removal and replacement of forward hinge include 0.010 inch weld shrinkage allowance and 0.0005 inch/inch heat treat shrinkage allowance where applicable.

i. Remove forward hinge per View H, dimensions (13 and 14, figure 11), by cutting with PWA 71331 fixture as follows:

(1) Install air motor assembly onto forward rail(16, figure 7), with cut-off wheel facing inboard, and slide against fixed stop(22). Secure to rail by rotating end stop(15) 180 degrees and tightening socket head cap screw(14).

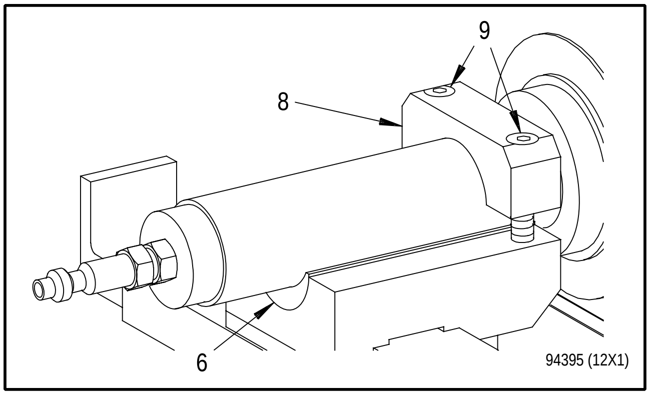


Figure 7. Forward Hinge Replacement - Hinge Removal Fixture (Sheet 2 of 4)

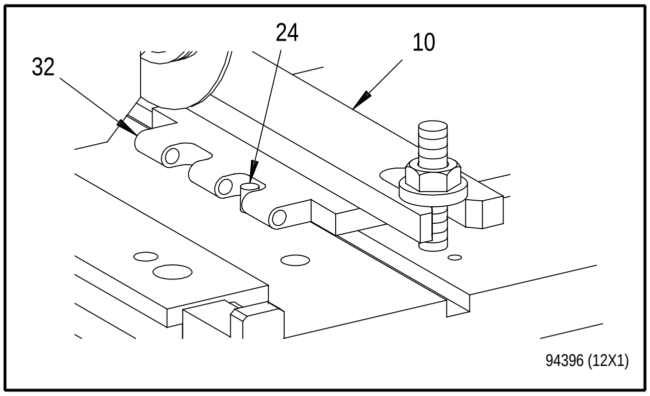


Figure 7. Forward Hinge Replacement - Hinge Removal Fixture (Sheet 3 of 4)

(2) Install divergent segment into fixture by locating mid hinge locator pin trunnions into U-blocks(23). Inside edge of outboard lug on divergent segment(32) should contact 0.1875 inch diameter locator pin(24) per figure 7, sheet 3.

(3) Install two end clamps(10), marking side up, and center clamp(13) and finger-tighten six flange nuts(12).

(4) Adjust knurled screw(25) until divergent segment face contacts 0.500 inch diameter locator pin(26) per figure 7, sheet 4. Secure with knurled screw(25) and knurled check nut(27).

(5) Secure divergent segment flat against fixture base by evenly tightening six flange nuts.

(6) Change cut-off wheel(4), when necessary, as follows:

(a) Ensure air supply is disconnected from air motor end connection(1).

(b) Use wrench(2) to remove air motor flange(3) nut, outer blotter, and outer flange detail.

(c) Remove old cut-off wheel, inner back-up flange, and inner blotter.

(d) Inspect both flanges and blotters for signs of fatigue or rubbing. Replace flanges and/or blotters as required.

(e) Reinstall inner blotter and flange, stepped face out, onto threaded spindle.

(f) Install new cut-off wheel, outer flange (stepped face in), and blotter onto spindle.

CAUTION

Over tightening of flange nut may deform flanges and cut-off wheel and damage divergent segment when making hinge cuts.

(g) Thread air motor flange nut hand tight against outer blotter. Snug flange nut using wrenches(2). Do not over tighten as flanges and cut-off wheel may be deformed.

(7) Align air motor(5) and cut-off wheel(4) with fixture as follows:

(a) Loosen two socket head cap screws(9) and remove clamp and air motor.

(b) Put spacer(6) into slide(7) with concave side of spacer up. See figure 7, sheet 2.

(c) Put air motor onto spacer with control handle up and air motor end connection(1) outboard of base.

(d) Put clamp(8) over air motor just behind cut-off wheel guard and hand-secure using two socket head cap screws(9).

(e) Use a 0.125 inch shim to set inner face of cut-off wheel at 0.125 inch from indicated side of end clamp.

(f) When gap is correct, secure air motor to slide with two screws(9).

(8) Ensure air supply is clean and dry and is regulated to 90 psi. Install air supply hose to end connection(1).

CAUTION

To prevent fluid entrapment in honeycomb, all finishing shall be done dry.

(9) Begin removing divergent segment forward hinge panel by drawing cut-off wheel across segment. Use constant force and motor rpm while drawing cut-off wheel across segment. All finishing shall be done dry to prevent entrapment of fluids in honeycomb.

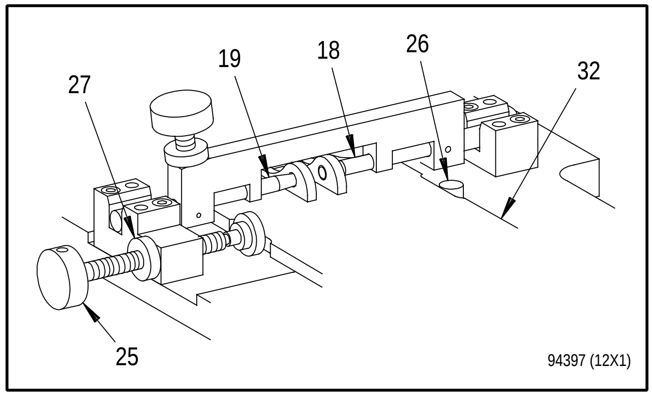


Figure 7. Forward Hinge Replacement - Hinge Removal Fixture (Sheet 4 of 4)

Legend for figure 7

1. End connection
2. Wrenches
3. Flange
4. Cut-off wheel
5. Air motor
6. Spacer
7. Slide
8. Clamp
9. Socket head cap screw
10. End clamp
11. Handle
12. Flange nut
13. Center clamp
14. Socket head cap screw
15. End stop
16. Forward rail
17. Locating pin frame
18. Fixed locator pin
19. Adjustable locator pin
20. Knurled head screw
21. Jam nut
22. Fixed stop
23. U block
24. 0.1875 inch diameter locator pin
25. Knurled screw
26. 0.500 inch diameter locator pin
27. Knurled check nut
28. Aft rail
29. End stop
30. Socket head cap screw
31. Storage screw
32. Divergent segment

(10) Disconnect air supply hose from motor.

(11) Align cut-off wheel per step i.(7) except remove spacer(6).

(12) Reconnect air supply hose and complete removing forward hinge panel by drawing cut-off wheel across segment as before.

(13) Disconnect air supply hose from motor.

(14) Loosen two cap screws and replace spacer between slide and bottom of air motor.

(15) Remove two end clamps(10) and center clamp(13) details. Remove machined divergent segment and mid locator assembly from fixture U-blocks. Remove mid locator assembly from divergent segment.

j. Deburr finished end of panel K. Deburr both edges of both facesheets.

k. Prepare panel K for welding per View J. Use PWA 55829 punch to depress core from face sheet to dimension(15, figure 11). Use handgrinder to remove all traces of core material from face sheets(16).

l. Use PWA 71332 weld fixture to position panel K and forward hinge(11) as follows:

(1) Prepare fixture as follows:

(a) Remove fixture from storage container, wipe clean, and place on clean, flat work surface, shorter jig feet down.

(b) Inspect fixture for missing details or imperfections which may impact tool function.

(c) Remove three clamps(1, figure 8) and retract five knurled screws(2).

(2) If replacing both forward and aft hinge panels, accomplish the following:

(a) Install the mid locator assembly(3) into mid hinge holes by retracting adjustable pin(4) and inserting fixed pin(5) into one mid hinge hole.

(b) Push the adjustable pin into other mid hinge hole and secure with knurled screw(6) and knurled check nut(7).

(3) If replacing either forward only or both hinge panels, accomplish the following:

(a) Rotate half-turn screw(15) 180 degrees and raise clamp arm(16).

(b) Place divergent segment (cut off at forward hinge) onto fixture base, gaspath face down.

(c) If replacing only forward hinge panel(11, figure 11), accomplish the following:

1 Retract aft locator arm assembly adjustable pin(17, figure 8) and push aft hinge 0.200 inch diameter hole into aft locator arm assembly fixed pin(18).

2 Push adjustable pin into aft hinge panel 0.250 inch diameter hole and secure with knurled screw(19) and knurled check nut(20).

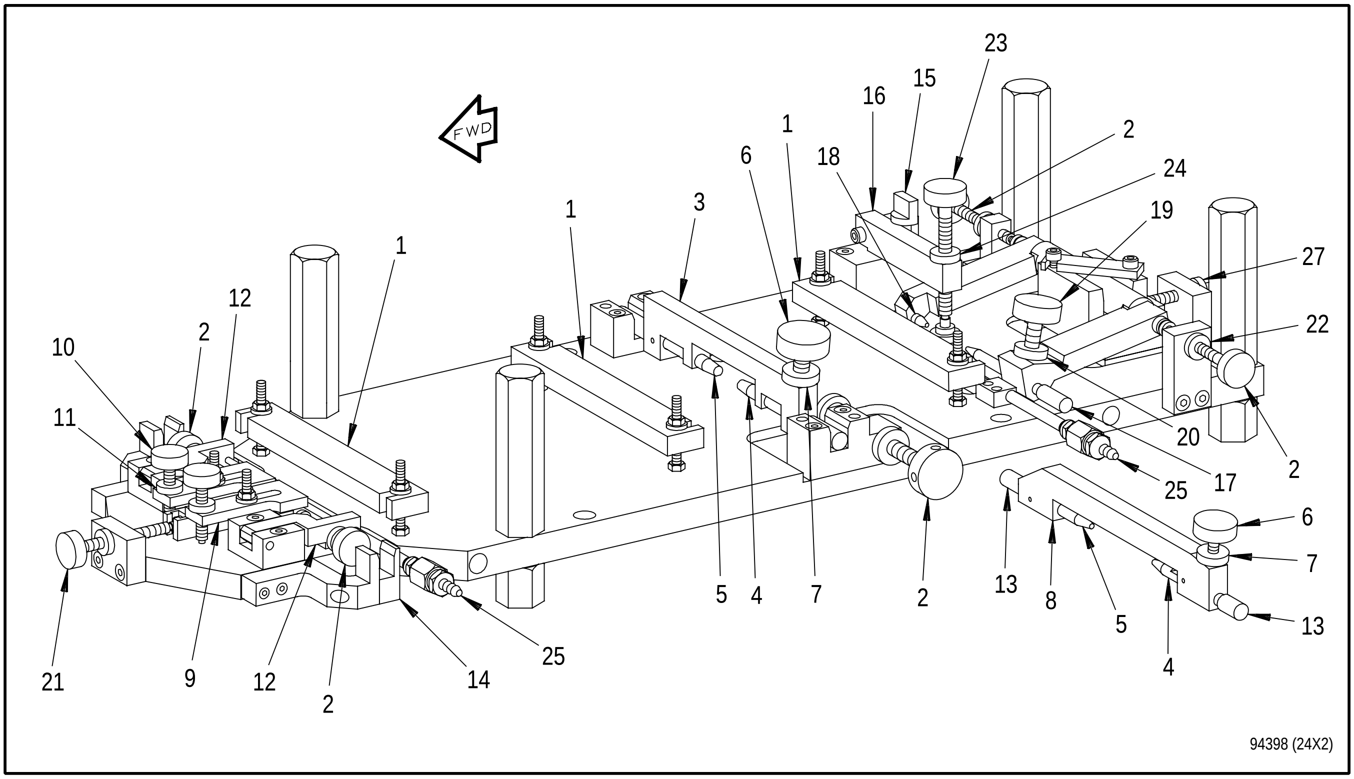


Figure 8. Forward Hinge Replacement - Weld Fixture (Sheet 1 of 3)

(d) Use knurled screw(2, figure 8, sheet 2) to position divergent segment(30) against 0.500 inch diameter locator pin(26). Tighten check nut to secure segment in place.

(e) Retract two forward clamps(9).

(f) Place new forward hinge detail into fixture, gaspath face down, with fishmouth end facing cut-off face of divergent segment. If forward hinge panel will not fit, raise divergent segment slightly and lower hinge and segment together. If parts still do not fit, retract forward locator slide assembly outward 0.020 inch using knurled screw(21). If parts still do not fit, remove divergent segment and accomplish steps (g) through (i). If parts fit, go to step (j).

CAUTION

To prevent fluid entrapment in honeycomb, all finishing shall be done dry.

(g) Finish forward end of panel K to meet dimension(10, figure 11) per View G. Measure with PWA 71332 weld fixture as required and use PWA 71331 fixture to machine panel. All finishing shall be done dry to prevent entrapment of fluids in honeycomb.

(h) Deburr finished end of panel K. Deburr both edges of both facesheets.

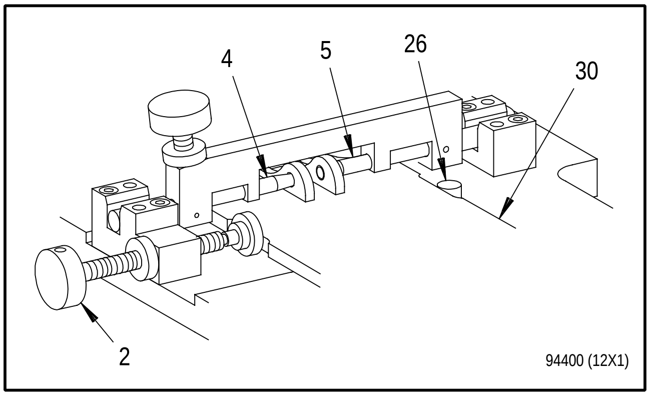


Figure 8. Forward Hinge Replacement - Weld Fixture (Sheet 2 of 3)

(i) Prepare panel K for welding per View J. Use PWA 55829 punch to depress core from face sheet to dimension(15). Use handgrinder to remove all traces of core material from face sheets(16). Repeat step (f).

(j) Inspect for proper dimension(10) per View G. If dimension(10) is not acceptable, remove divergent segment and go to step (g).

(k) Use GO/NO-GO gage and two knurled screws(2, figure 8, sheet 3) to adjust forward hinge panel side to side per requirements of figure 11.

(l) Slide clamps(9, figure 8, sheet 3) over forward hinge detail and secure with both knurled screws(2) and jam nuts(22).

(l1) Install three clamps(1) and secure divergent segment with six flange nuts.

(m) Install argon gas purge tube(25) through guide arm(12) 0.188 inch diameter hole and thread into opposite guide arm 0.125 inch diameter hole. Connect gas purge supply to hose barb fitting of argon tube(25).

m. Prior to welding, wipe panel K, new forward hinge(11, figure 11), and PWA 71332 weld fixture, clean with isopropyl alcohol. Refer to T.O. 2-1-111, SPOP 208, Method A.

n. Use PWA 71332 weld fixture to weld new forward hinge to panel K as follows:

(1) Tack forward hinge panel weld joint in place. Refer to T.O. 2-1-111. No undercut or underfill is permitted. Use argon purge tube of weld fixture. Parent material of forward hinge is PWA 649, honeycomb gaspath facesheet is AMS 5544 and non-gaspath facesheet is AMS 5596. Use AMS 5832 filler metal.

(2) Turn fixture over and tack weld back side of weld joint as above.

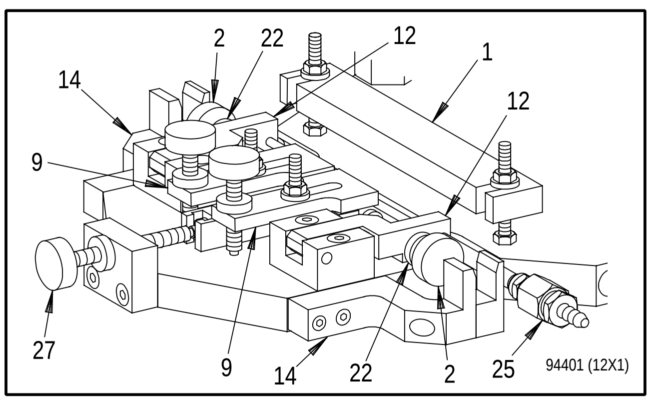


Figure 8. Forward Hinge Replacement - Weld Fixture (Sheet 3 of 3)

Legend for figure 8

1. Clamp
2. Knurled screw
3. Mid locator assembly
4. Adjustable pin
5. Fixed pin
6. Knurled screw
7. Knurled check nut
8. Forward locator assembly
9. Forward clamp
10. Knurled screw
11. Jam nut
12. Guide arm
13. Trunnion
14. Block
15. Half-turn screw
16. Clamp arm
17. Aft locator arm assembly adjustable pin
18. Aft locator arm assembly fixed pin
19. Knurled screw
20. Knurled check nut
21. Knurled screw
22. Jam nuts
23. Knurled screw
24. Jam nut
25. Argon gas purge tube
26. 0.500 inch diameter locator pin
27. Knurled screw
28. Guide block
29. Support block
30. Divergent segment

(3) Rotate half-turn screw(15, figure 8) 180 degrees and raise clamp arm(16). Loosen knurled check nut(20) and knurled screw(19) and retract adjustable pin(17).

(4) Loosen both jam nuts(22) and adjust two knurled screws(2) until aft locator assembly is free from aft hinge holes.

(5) Lower clamp arm and secure with half-turn screw. Adjust knurled screw(23) until screw clamp pad loosely contacts aft hinge back face.

(6) Loosen two forward clamps(9) until clamp face makes light contact with forward hinge top face.

(7) Loosen two jam nuts(22) and two knurled screws(2). Loosen, but do not remove, three clamps(1).

(8) Finish welding forward hinge joint. Refer to T.O. 2-1-111. No undercut or underfill is permitted. Use argon purge tube of weld fixture. Parent material of forward hinge is PWA 649, honeycomb gaspath facesheet is AMS 5544 and non-gaspath facesheet is AMS 5596. Use AMS 5832 filler metal.

o. Remove welded divergent segment when cool. Remove mid locator assembly, if installed. Inspect Surface F for required profile and flatness and straighten if necessary.

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

p. Optional to local fluorescent penetrant inspect weld and heat affected areas to SFPS 38. Refer to SPOP 70 in T.O. 2-1-111. No cracks permitted. Do not allow penetrant to enter honeycomb core.

q. Ultrasonically clean nozzle segment assembly with isopropyl alcohol for 30 minutes minimum. Drain thoroughly. Cover part after cleaning to prevent contamination.

r. Bake at 300° to 350°F (149° to 177°C) for 30 minutes minimum.

s. Place part on flat heat-treat spider with flat side down.

t. Solution heat treat per SPOP 761, cycle 101, except hold temperature for one hour. Refer to T.O. 2-1-111.

u. Optional to radiographic inspect welds, Level 2T, to SXRS 33. Refer to T.O. 2-1-111. No cracks permitted.

v. Place part on flat heat-treat spider with flat side down.

w. Stabilization heat treat per SPOP 763, cycle 103, using argon atmosphere. Refer to T.O. 2-1-111. Precipitation heat treat per SPOP 764, cycle 104, using argon atmosphere. Refer to T.O. 2-1-111. No hardness impressions permitted on honeycomb.

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

x. Optional to local fluorescent penetrant inspect weld and heat affected areas to SFPS 38. Refer to SPOP 70 in T.O. 2-1-111. No cracks permitted. Do not allow penetrant to enter honeycomb core.

y. Radiographic inspect welds, Level 2T, to SXRS 33. Refer to T.O. 2-1-111. No cracks permitted.

z. Machine forward hinge(11, figure 11) using PWA 71335 fixture as follows:

(1) Place fixture on clean flat work surface. Inspect for missing details or imperfections which may impact tool function.

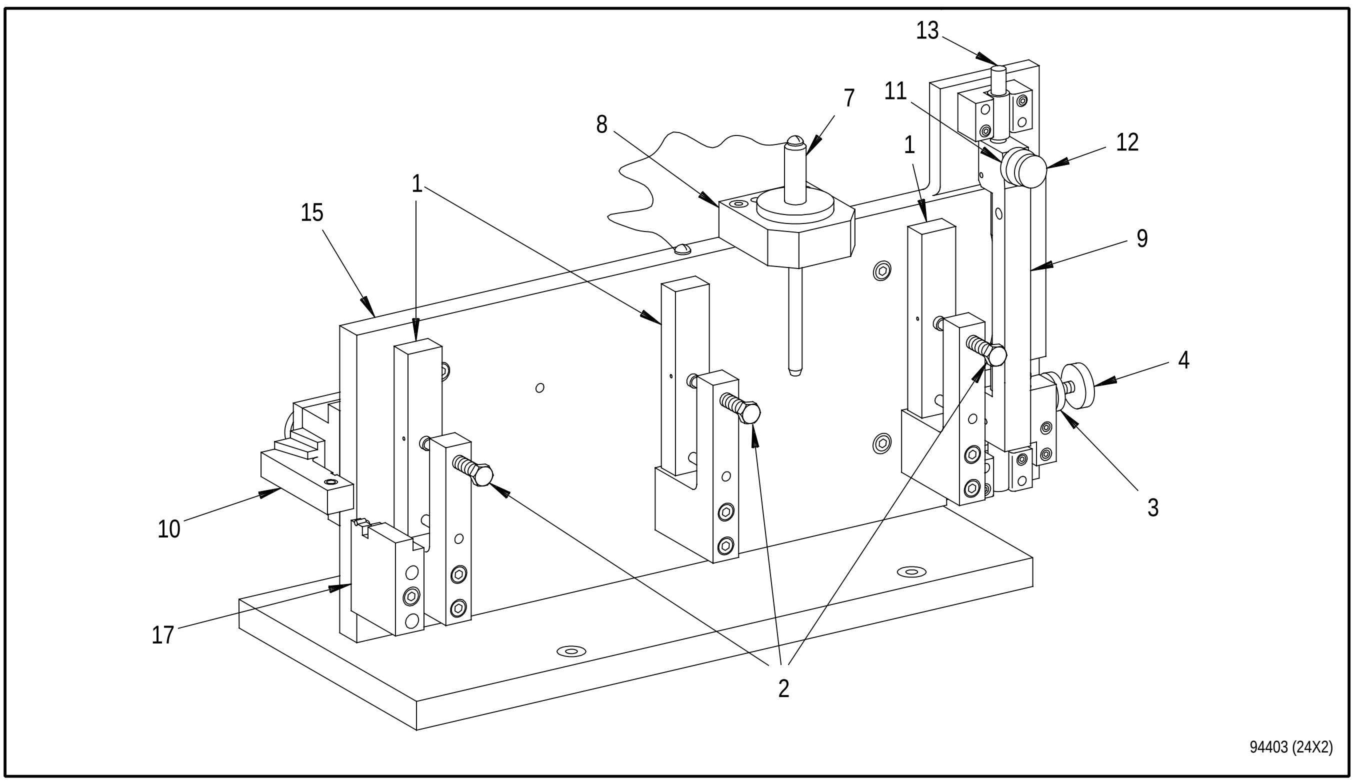


Figure 9. Forward Hinge Replacement - Machining Fixture (Sheet 1 of 3)

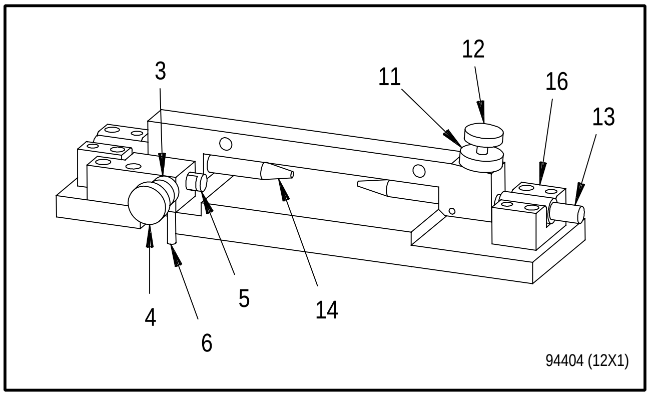


Figure 9. Forward Hinge Replacement - Machining Fixture (Sheet 2 of 3)

(2) Retract three clamps(1, figure 9) by loosening hex head screws(2).

(3) Loosen jam nut(3) and knurled screw(4) and retract positive stop pin(5). Lock pin in place by rotating dowel pin(6).

(4) Remove floating pin(7) from floating block(8).

(5) Remove two socket head cap screws and remove locator assembly(9) from storage position.

(6) Remove socket head cap screw and remove feeler block(10) from storage position on up-right back face.

(7) Replace all three screws in storage holes.

(8) Install fixture on horizontal mill, or vertical mill with 90 degree head or with base mounted on angle plate, and loosely clamp in place.

(9) Loosen jam nut(11) and knurled screw(12) and retract aft locator assembly adjustable pin(13).

(10) Place aft locator assembly fixed pin(14) into divergent segment aft 0.250 inch diameter hole and push adjustable pin into the 0.200 inch diameter hole.

(11) Secure adjustable pin in place with knurled screw and jam nut.

(12) With divergent segment gas path face toward up-right, slide divergent segment and locator assembly between clamps and up-right(15) until locator pin(13 and 14) trunnions fit into U-blocks(16).

(13) Slide divergent segment toward fixture base until unfinished forward hinge edge rests against vee block assembly(17) 0.1250 inch diameter roll(20).

(14) Adjust three hex head screws(2) until clamps(1) loosely contact divergent segment face.

(15) Release positive stop pin(5) and secure in place using knurled screw(4) and jam nut(3).

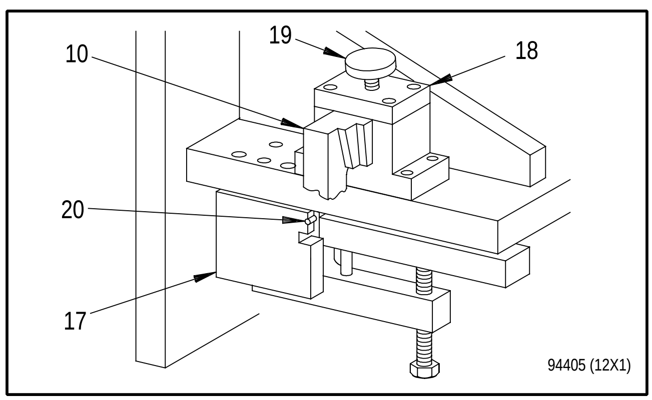


Figure 9. Forward Hinge Replacement - Machining Fixture (Sheet 3 of 3)

Legend for figure 9

1.	Clamp	11.	Jam nut
2.	Hex head screw	12.	Knurled screw
3.	Jam nut	13.	Adjustable pin, aft locator assembly
4.	Knurled screw	14.	Fixed pin, aft locator assembly
5.	Positive stop pin	15.	Up-right
6.	Dowel pin	16.	U-block
7.	Floating pin	17.	Vee block
8.	Floating block	18.	Block and plate assembly
9.	Locator assembly	19.	Knurled screw
10.	Feeler block	20.	Roll, 0.1250 inch diameter

NOTE

Floating pin is used as secondary check that mid to aft hole locations are within allowable tolerance.

(16) Insert floating pin(7) through floating block(8) and divergent segment mid-hinge holes. If pin will not fit through both mid-hinge holes, mid or aft hole locations may be incorrect. Determine cause before continuing repair.

(17) Place feeler block(10) through block and plate assembly(18) such that feeler block face contacts divergent segment unfinished forward hinge radius. Secure feeler block in place using knurled screw(19).

(18) Establish vertical datum by indicating off a 0.010 inch feeler gage placed onto vee block(17) top face. Vee block top face is flush with tangent to roll(20) within 0.0005 inch.

NOTE

There are two angles to be machined into forward hinge panel.

(19) Set cutter angle by adjusting fixture position using feeler block(10) and 0.010 inch thick feeler gage. Secure fixture in place.

(20) Remove feeler block and place aside.

CAUTION

To prevent fluid entrapment in honeycomb, all finishing shall be done dry.

(21) Use vertical datum and cutter angle to finish machine forward hinge(11, figure 11). No steps or sharp edges permitted. All finishing shall be done dry to prevent entrapment of fluids in honeycomb.

(22) Repeat steps z.(19) through z.(21) for second angle.

(23) Return feeler block to storage positon.

(24) Use clean, dry air to blow all chips away from fixture and divergent segment.

(25) Lower positive stop pin and back off three clamp pads.

(26) Remove floating pin from segment and floating block and slide divergent segment out of fixture.

(27) Remove aft locator assembly and return to storage position.

(28) Secure all knurled screws in place, reinstall floating pin into floating block, and adjust all clamps until face contacts up-right face.

aa. Use PWA 71333 drill and ream fixture to drill and ream forward hinge lug hole as follows:

(1) Place fixture on clean flat work surface. Inspect for missing details or imperfections which may impact tool function.

(2) Retract three clamp pads(1, figure 10) by pulling down on three toggle clamps(2).

(3) Loosen jam nut(3) and knurled screw(4) and retract positive stop pin(5). Lock pin in place by rotating dowel pin(6).

(4) Remove floating pin(7) from floating block(8).

(5) Loosen hand knob(21) and retract drill bushing plate(10).

(6) Remove two socket head cap screws and remove locator assembly(9) from storage position. Replace two screws in storage holes.

(7) Install fixture on vertical mill or radial arm drill.

(8) Loosen jam nut(11) and knurled screw(12) and retract aft locator adjustable pin(13).

(9) Place aft locator fixed pin(14) into divergent segment aft 0.250 inch diameter hole and push adjustable pin into the 0.200 inch diameter hole.

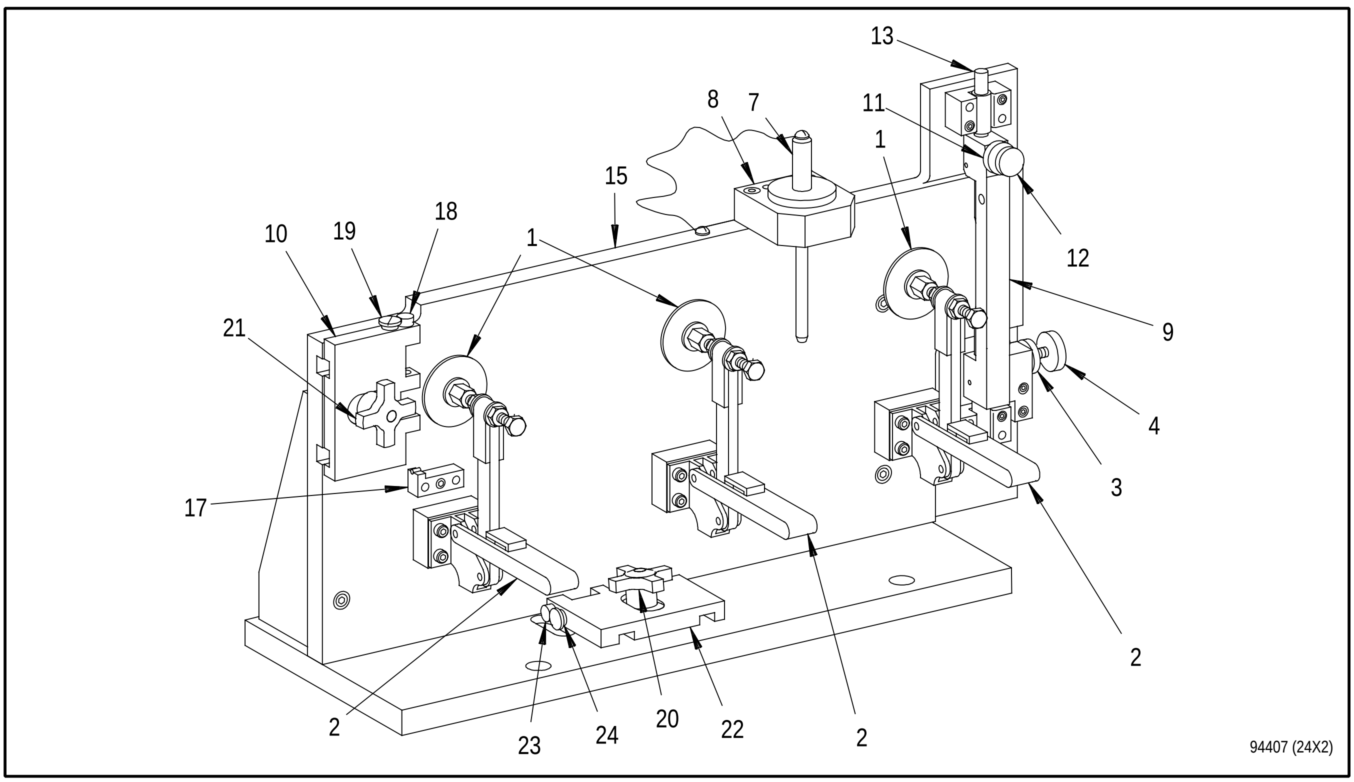


Figure 10. Forward Hinge Replacement - Drill and Ream Fixture (Sheet 1 of 2)

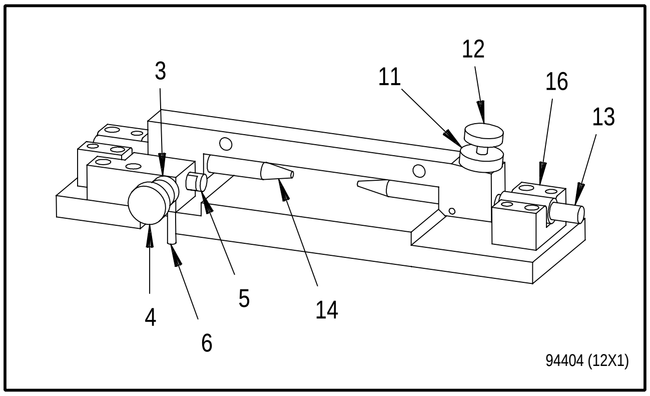


Figure 10. Forward Hinge Replacement - Drill and Ream Fixture (Sheet 2 of 2)

(10) Secure aft locator assembly in place with knurled screw and jam nut.

(11) With divergent segment gas path face toward up-right, slide divergent segment and locator assembly between clamp pads and up-right(15) until locator pin(13 and 14) trunnions fit into U-blocks(16).

(12) Slide divergent segment toward fixture base until forward hinge edge rests against vee block assembly(17) 0.1250 inch diameter roll(25).

(13) Adjust three toggle clamps(2) until clamp pads(1) loosely contact divergent segment face.

(14) Release positive stop pin(5) and secure in place using knurled screw(4) and jam nut(3).

NOTE

Floating pin is used as secondary check that mid to aft hole locations are within allowable tolerance.

(15) Insert floating pin(7) through floating block(8) and divergent segment mid-hinge holes. If pin will not fit through both mid-hinge holes, mid or aft hole locations may be incorrect. Determine cause before continuing repair.

(16) Slide drill bushing plate(10) forward until bushing plate face contacts divergent segment forward hinge radius. Secure plate in place using hand knob(21).

(17) Adjust fixture position until drill bushing is below spindle center line and clamp fixture in place.

(18) Replace renewable drill bushing(18), when required, by rotating bushing until free from lock screw(19) and lifting bushing out of bushing guide plate. Install new drill bushing and secure in place by rotating under lock screw.

(19) Use drill bushing and a No. 11 carbide drill to drill 0.1875 inch diameter hole through forward hinge lugs.

(20) Remove hand knobs(20 and 21). Replace drill bushing plate(10) with reamer bushing plate(22) by aligning key slot in reamer bushing plate with four keys in up-right(15). Place drill bushing plate in storage position and secure with hand knob(20).

(21) Slide reamer bushing plate(22) forward until bushing plate face contacts divergent segment forward hinge radius. Secure plate in place using hand knob(21).

Legend for figure 10

1. Clamp pad
2. Toggle clamp
3. Jam nut
4. Knurled screw
5. Positive stop pin
6. Dowel pin
7. Floating pin
8. Floating block
9. Locator assembly
10. Drill bushing plate
11. Jam nut
12. Knurled screw
13. Adjustable pin, aft locator
14. Fixed pin, aft locator
15. Up-right
16. U-block
17. Vee block assembly
18. Renewable drill bushing
19. Lock screw
20. Hand knob
21. Hand knob
22. Reamer bushing plate
23. Renewable reamer bushing
24. Lock screw
25. Roll, 0.1250 inch diameter

(22) Adjust fixture position until reamer bushing is below spindle center line and clamp fixture in place.

(23) Replace renewable reamer bushing(23), when required, by rotating bushing until free from lock screw(24) and lifting bushing out of bushing guide plate. Install new reamer bushing and secure in place by rotating under lock screw.

(24) Use reamer bushing and a No. 13 carbide drill to ream hole through forward hinge lugs to 0.1920 inch diameter.

(25) Use clean, dry air to blow all chips away from fixture and divergent segment.

(26) Lower positive stop pin and retract three clamp pads.

(27) Remove floating pin from segment and floating block and slide divergent segment out of fixture.

(28) Remove aft locator assembly and return to storage position.

(29) Secure all knurled screws in place, reinstall floating pin into floating block, and adjust all clamps until face contacts up-right face.

(30) Return reamer bushing plate to storage position and install drill bushing plate onto up-right keys. Secure bushing plates in place with hand knobs.

ab. Deburr forward hinge.

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

ac. Local fluorescent penetrant inspect weld and heat affected areas and machined areas to SFPS 38. Refer to SPOP 70 in T.O. 2-1-111. No cracks permitted. Do not allow penetrant to enter honeycomb core.

ad. Wipe entire part clean with isopropyl alcohol. Refer to T.O. 2-1-111, SPOP 208, Method A. Cover part after cleaning to prevent contamination.

ae. Coat per paragraph 6.

af. Install forward and aft bridge clamp seats per paragraph 5.

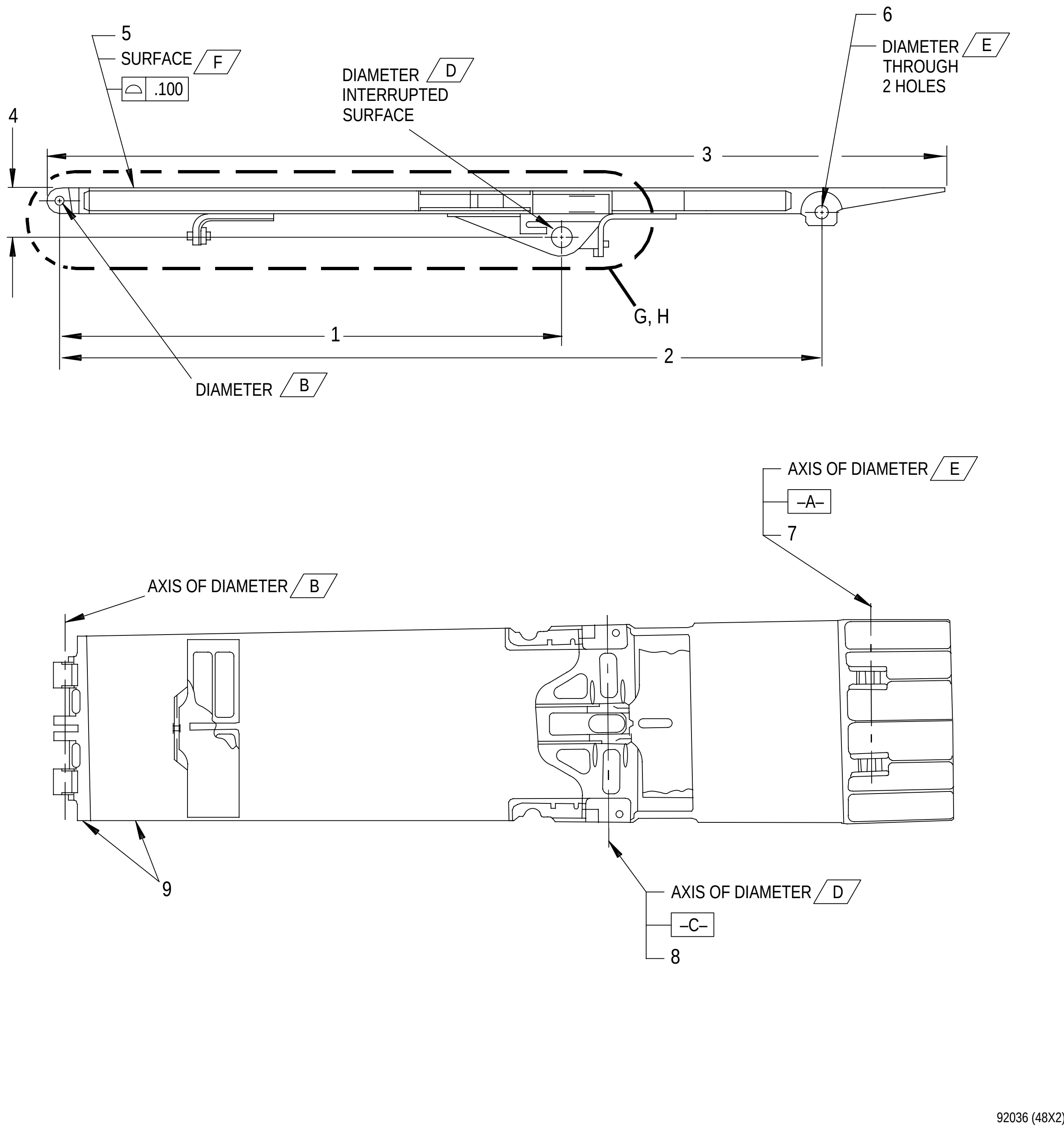


Figure 11. Augmentor Divergent Nozzle Segment Assembly (Typical PN 4071142) - Forward Hinge Replacement and Repair (Sheet 1 of 4)

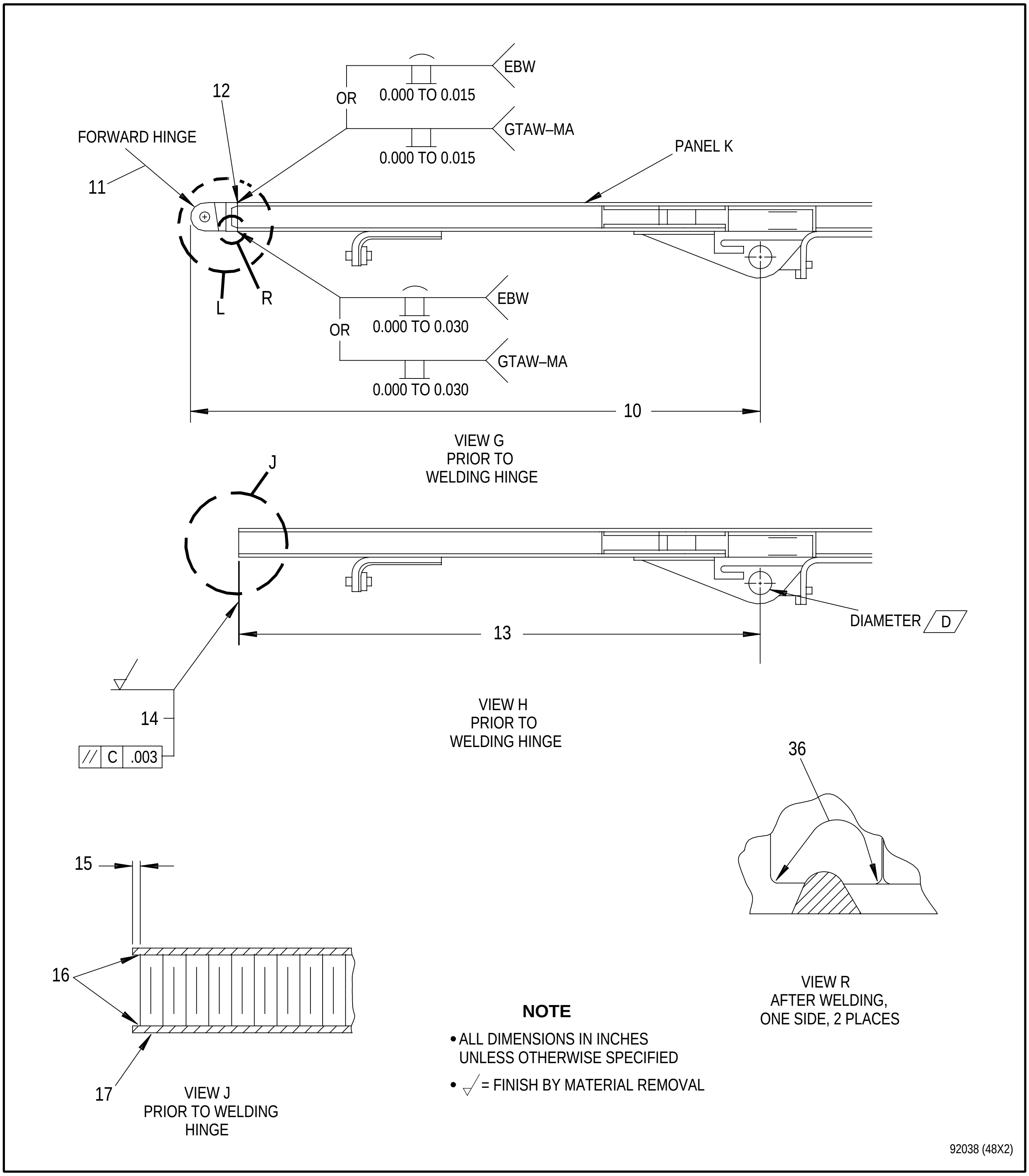


Figure 11. Augmentor Divergent Nozzle Segment Assembly (Typical PN 4071142) - Forward Hinge Replacement and Repair (Sheet 2 of 4)

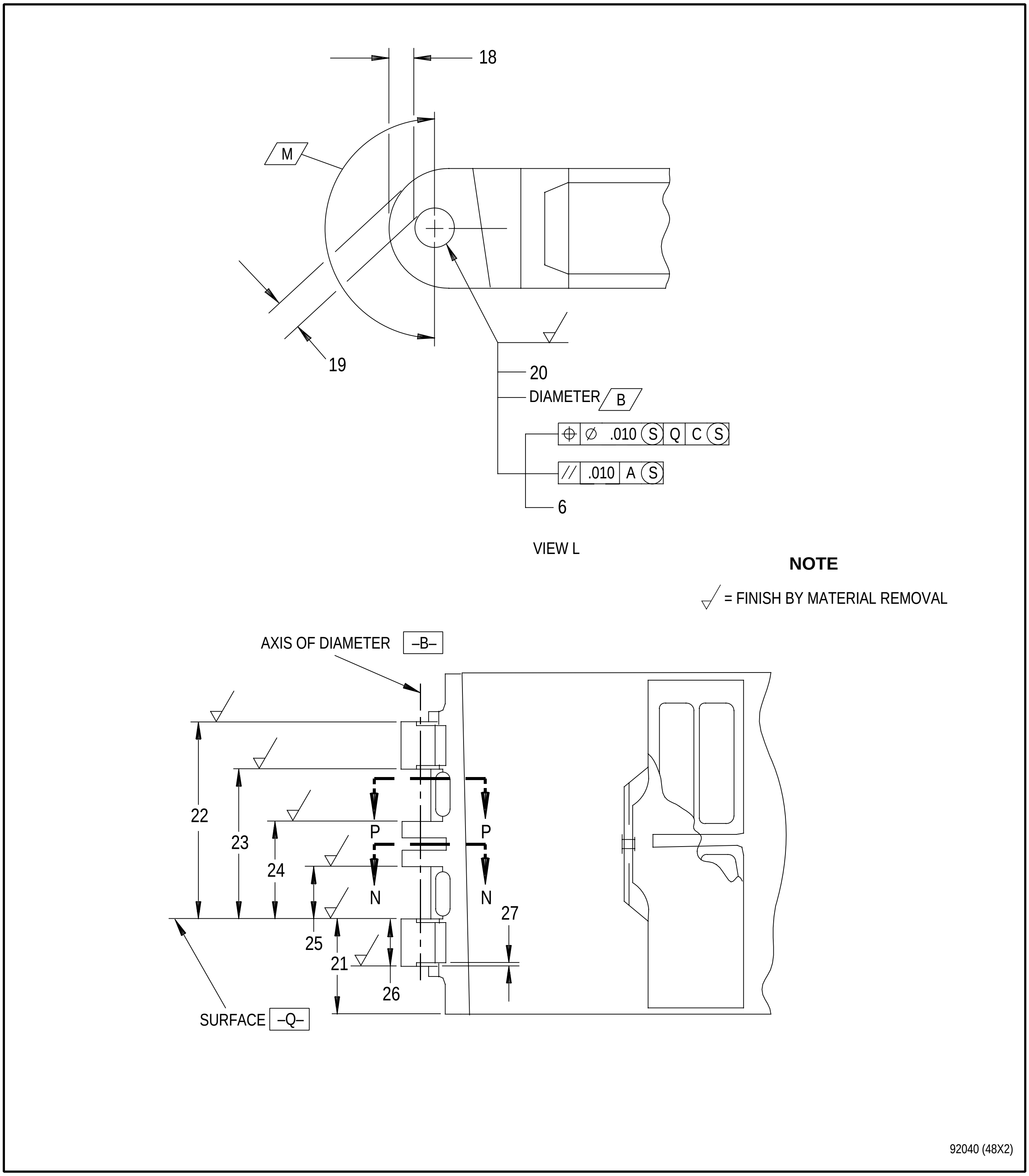


Figure 11. Augmentor Divergent Nozzle Segment Assembly (Typical PN 4071142) - Forward Hinge Replacement and Repair (Sheet 3 of 4)

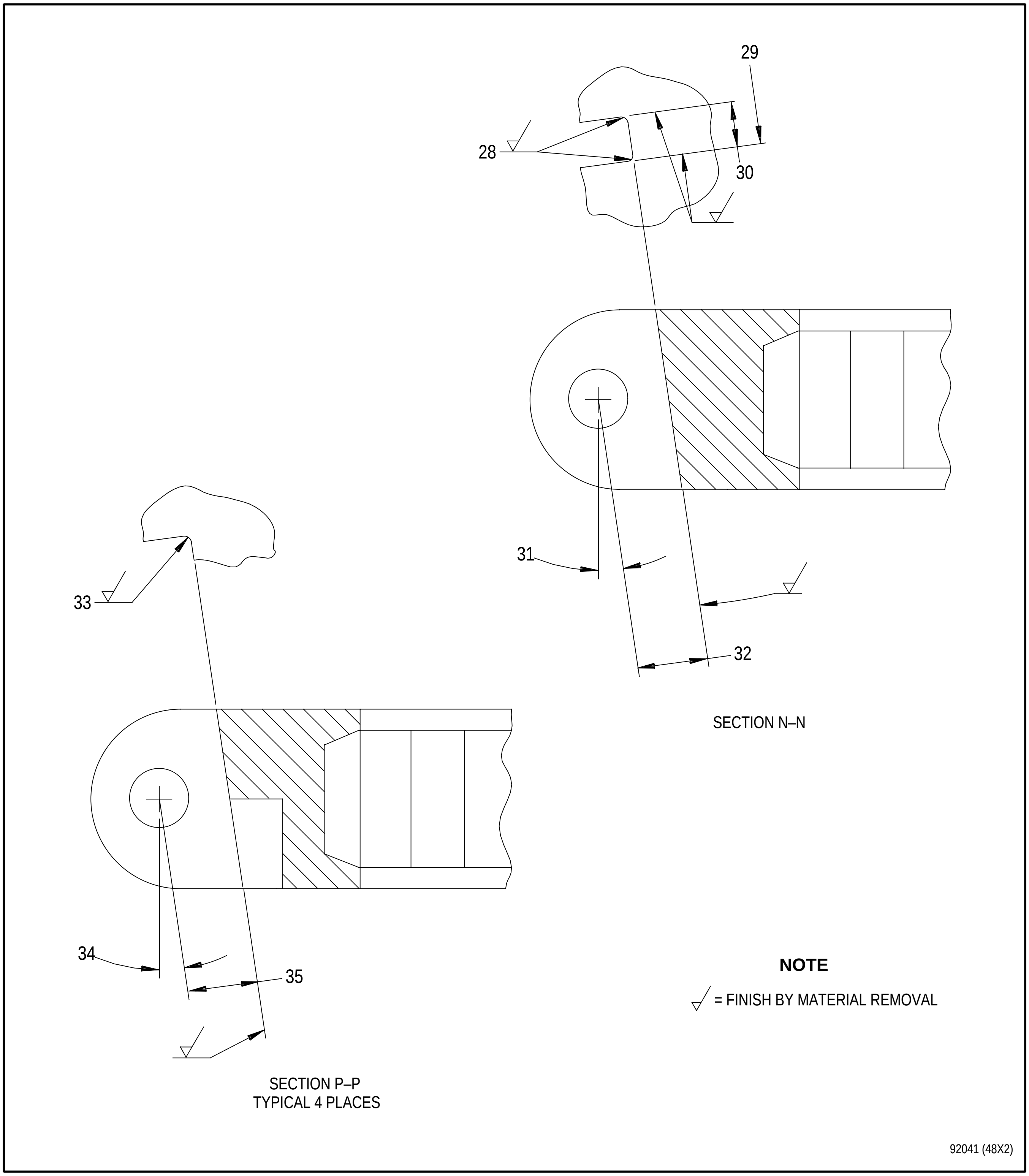


Figure 11. Augmentor Divergent Nozzle Segment Assembly (Typical PN 4071142) - Forward Hinge Replacement and Repair (Sheet 4 of 4)

Legend for figure 11

1. 12.678 inches
2. 18.715 to 18.825 inches
3. Gaspath side surface length from aft hinge end to forward hinge radius tangency point
4. 0.487 inch
5. Profile of Surface F shall be within 0.100 inch. Flatness within profile limits shall not exceed 0.015 inch/inch for distance (3).
6. This diameter shall be located within 0.010 inch diameter of True Position in relation to Datum Q and Datum C. This diameter shall also be parallel to Datum A within 0.010 inch. This diameter, Datum C, and Datum A are regardless of feature size.
7. Datum A is the Axis of Diameter of E.
8. Datum C is the Axis of Diameter of D.
9. In common plane within 0.025 inch total, both sides
10. 12.890 to 12.910 inches. Allows 0.010 inch for weld shrinkage and 0.006 inch for heat treat shrinkage.
11. Forward hinge, PN 4069915
12. Clamped tightly, no gap
13. 12.132 to 12.152 inches
14. Parallel to Datum C within 0.003 inch
15. 0.020 to 0.070 inch after dressing core
16. Grind to remove core material from face sheets
17. Permissible to prepare face sheets for weld. 0.022 inch minimum wall thickness must be maintained.
18. 0.095 to 0.125 inch
19. 0.095 inch minimum over Arc M, 4 places
20. 0.190 to 0.195 inch diameter, interrupted surface

Legend for figure 11 (continued)

21. 1.200 to 1.185 inches
22. 2.455 to 2.478 inches
23. 1.859 to 1.873 inches
24. 1.224 to 1.238 inches
25. 0.619 to 0.629 inch
26. 0.595 to 0.618 inch
27. 0.035 inch minimum, 4 places
28. Modified radius, 0.003 to 0.010 inch
29. 0.993 to 1.013 inches from Surface Q
30. 0.145 to 0.160 inch
31. 8°0’±30’
32. 0.240 to 0.265 inch
33. Modified radius, 0.003 to 0.015 inch
34. 17°45’±30’
35. 0.227 to 0.251 inch
36. For distance shown, inside surfaces of both forward hinge and face sheets shall be smooth and continuous after welding.

9. AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY FORWARD AND AFT HINGE ATTACHMENT FUSION WELDS - CRACK REPAIR.
(See figure 1.)

a. Repair cracks up to 0.750 inch long as follows:

(1) Remove forward and aft bridge clamp seats per paragraph 5.

(2) Solution heat treat segment per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for one hour. Refer to T.O. 2-1-111.

(3) Remove surface oxides adjacent to crack prior to weld. Crack may be routed out.

(4) Prior to welding, wipe area to be welded clean with isopropyl alcohol. Refer to T.O. 2-1-111, SPOP 208, Method A.

(5) Manually tungsten inert gas fusion weld segment assembly in argon purged tank. Use AMS 5832 filler metal. Refer to T.O. 2-1-111.

(6) Local fluorescent penetrant inspect repair weld. Refer to SPOP 70 in T.O. 2-1-111. No cracks permitted. Reweld any cracks detected.

(7) Solution heat treat segment per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for one hour. Refer to T.O. 2-1-111.

(8) Optional to radiographic inspect welds, Level 2T. Refer to T.O. 2-1-111. No cracks permitted. Repeat entire procedure if crack is detected.

(9) Stabilization heat treat per SPOP 763, cycle 103. Refer to T.O. 2-1-111. Precipitation heat treat per SPOP 764, cycle 104. Refer to T.O. 2-1-111. No hardness impressions permitted on honeycomb.

(10) Radiographic inspect welds, Level 2T. Refer to T.O. 2-1-111. No cracks permitted. Repeat entire procedure if crack is detected.

(11) Install forward and aft bridge clamp seats per paragraph 5.

10. AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY FORWARD HINGE - PUDDLE WELD REPAIR.
(See figure 12.)

NOTE

Repair procedures for forward hinge notch wear are provided in step a. Repair procedures for forward hinge center slot wear are provided in step b.

a. Puddle weld repair forward hinge notch wear area as follows:

(1) Remove forward and aft bridge clamp seats per paragraph 5.

(2) Solution heat treat per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for 30 minutes. Refer to T.O. 2-1-111.

(3) Prior to welding, wipe area to be welded clean with isopropyl alcohol. Refer to SPOP 208, Method A, in T.O. 2-1-111.

NOTE

Parent material of forward hinge is PWA 649 nickel alloy.

(4) Puddle weld build-up hinge worn areas using AMS 5832 filler metal. Refer to T.O. 2-1-111.

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

(5) Optional to local fluorescent penetrant inspect weld area. Refer to SPOP 70 in T.O. 2-1-111. No cracks permitted. Do not allow penetrant to enter honeycomb core.

(6) Solution heat treat per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for one hour. Refer to T.O. 2-1-111.

(7) Optional to radiographic inspect, Level 2T. Refer to T.O. 2-1-111. No cracks permitted. Repeat entire procedure if crack is detected.

(8) Stabilization heat treat per SPOP 763, cycle 103. Refer to T.O. 2-1-111. Precipitation heat treat per SPOP 764, cycle 104. Refer to T.O. 2-1-111. No hardness impressions permitted on honeycomb.

(9) Radiographic inspect, Level 2T. Refer to T.O. 2-1-111. No cracks permitted. Repeat entire procedure if crack is detected.

(10) Blend weld build-up back to original contour. Maintain dimension(5) per View A and lug cutouts per View B. Mismatch permissible.

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

(11) Local fluorescent penetrant inspect weld area. Refer to SPOP 70 in T.O. 2-1-111. No cracks permitted. Do not allow penetrant to enter honeycomb core.

(12) Install forward and aft bridge clamp seats per paragraph 5.

b. Puddle weld repair forward hinge center slot wear area as follows:

(1) Remove forward and aft bridge clamp seats per paragraph 5.

(2) Solution heat treat per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for 30 minutes. Refer to T.O. 2-1-111.

(3) Prior to welding, wipe area to be welded clean with isopropyl alcohol. Refer to SPOP 208, Method A, in T.O. 2-1-111.

NOTE

Parent material of forward hinge is PWA 649 nickel alloy.

(4) Puddle weld build-up center slot worn areas using AMS 5832 filler metal. Prepare as required. Refer to T.O. 2-1-111. Do not allow backside of weld to penetrate center slot and obscure hinge holes. Filler material that obscures hinge holes must be removed.

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

(5) Optional to local fluorescent penetrant inspect weld area. Refer to SPOP 70 in T.O. 2-1-111. No cracks permitted. Do not allow penetrant to enter honeycomb core.

(6) Solution heat treat per SPOP 761, cycle 101, or SPOP 762, cycle 102, except hold temperature for one hour. Refer to T.O. 2-1-111.

(7) Optional to radiographic inspect, Level 2T. Refer to T.O. 2-1-111. No cracks permitted. Repeat entire procedure if crack is detected.

(8) Stabilization heat treat per SPOP 763, cycle 103. Refer to T.O. 2-1-111. Precipitation heat treat per SPOP 764, cycle 104. Refer to T.O. 2-1-111. No hardness impressions permitted on honeycomb.

(9) Radiographic inspect, Level 2T. Refer to T.O. 2-1-111. No cracks permitted. Repeat entire procedure if crack is detected.

(10) Blend weld build-up back to original lug contour while maintaining dimension(5) per View A. Mismatch permissible.

(11) Mill center slot to dimensions (14) through (18) per Section E-E. Mismatch permissible.

(12) Remove any weld penetration on inside of hinge that obscures hinge hole by drilling or reaming. Use care not to enlarge hinge hole. See View A.

(13) Deburr all surfaces after machining or grinding has been performed.

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

(14) Local fluorescent penetrant inspect weld area. Refer to SPOP 70 in T.O. 2-1-111. No cracks permitted. Do not allow penetrant to enter honeycomb

(15) Install forward and aft bridge clamp seats per paragraph 5.

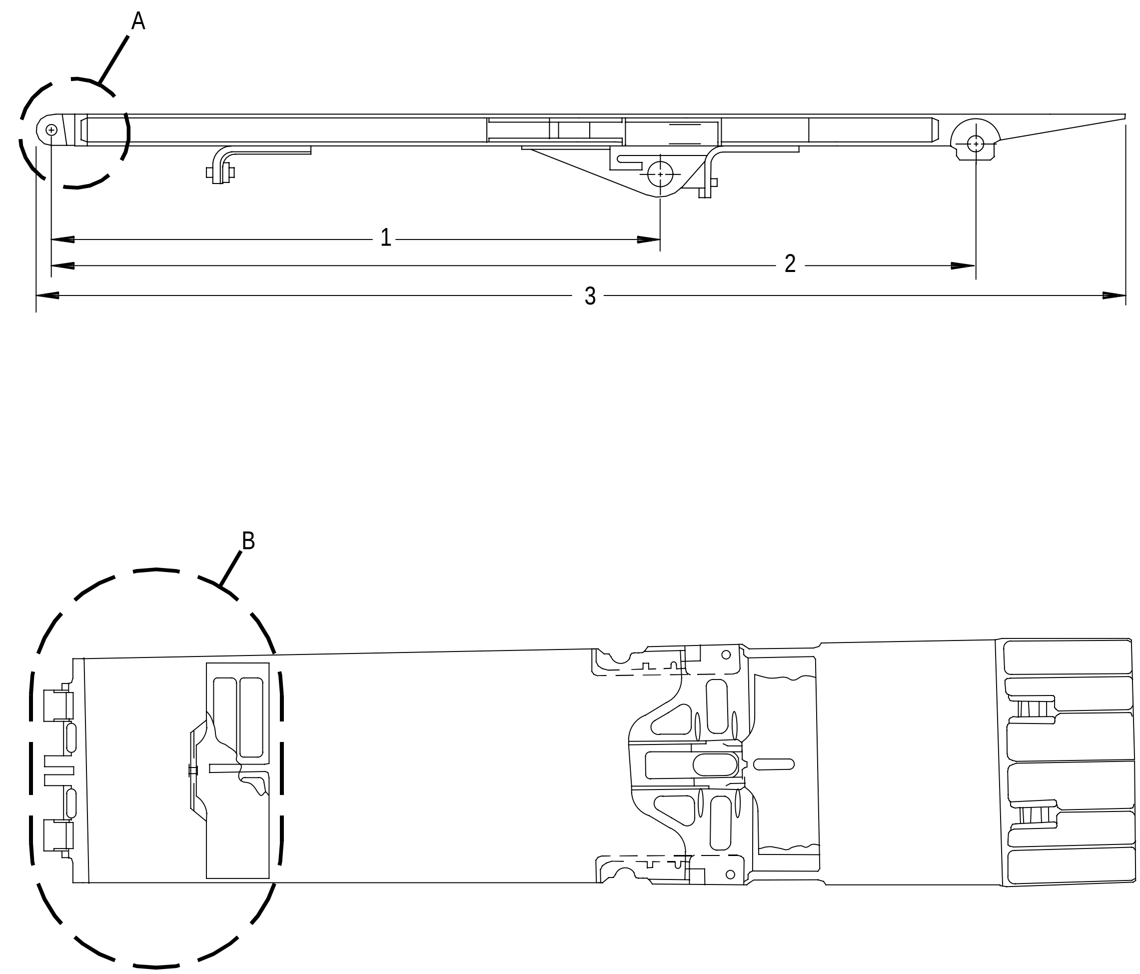


Figure 12. Augmentor Divergent Nozzle Segment Assembly (Typical PN 4071142) - Forward Hinge Notch and Center Slot Wear Puddle Weld Repair (Sheet 1 of 3)

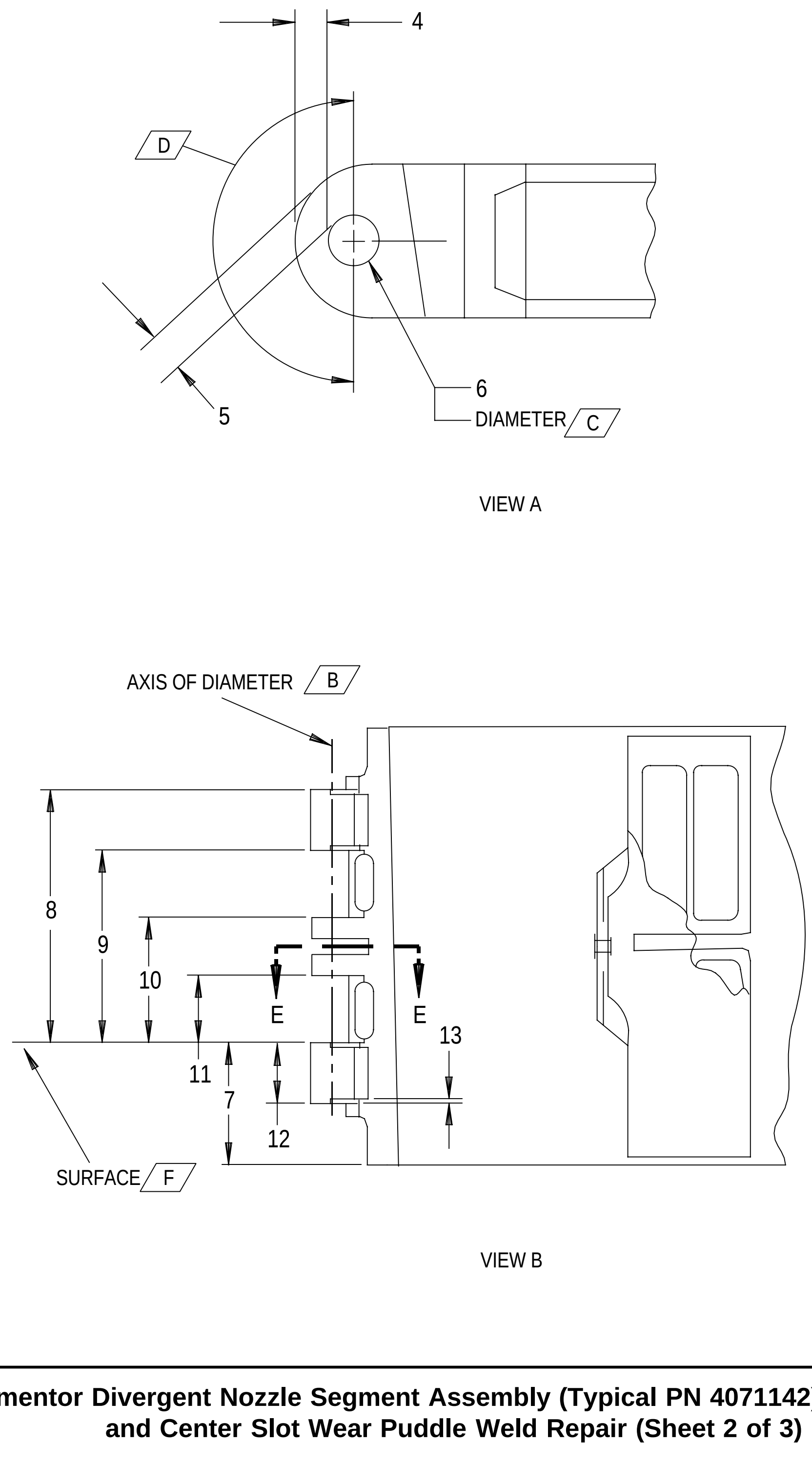


Figure 12. Augmentor Divergent Nozzle Segment Assembly (Typical PN 4071142) - Forward Hinge Notch and Center Slot Wear Puddle Weld Repair (Sheet 2 of 3)

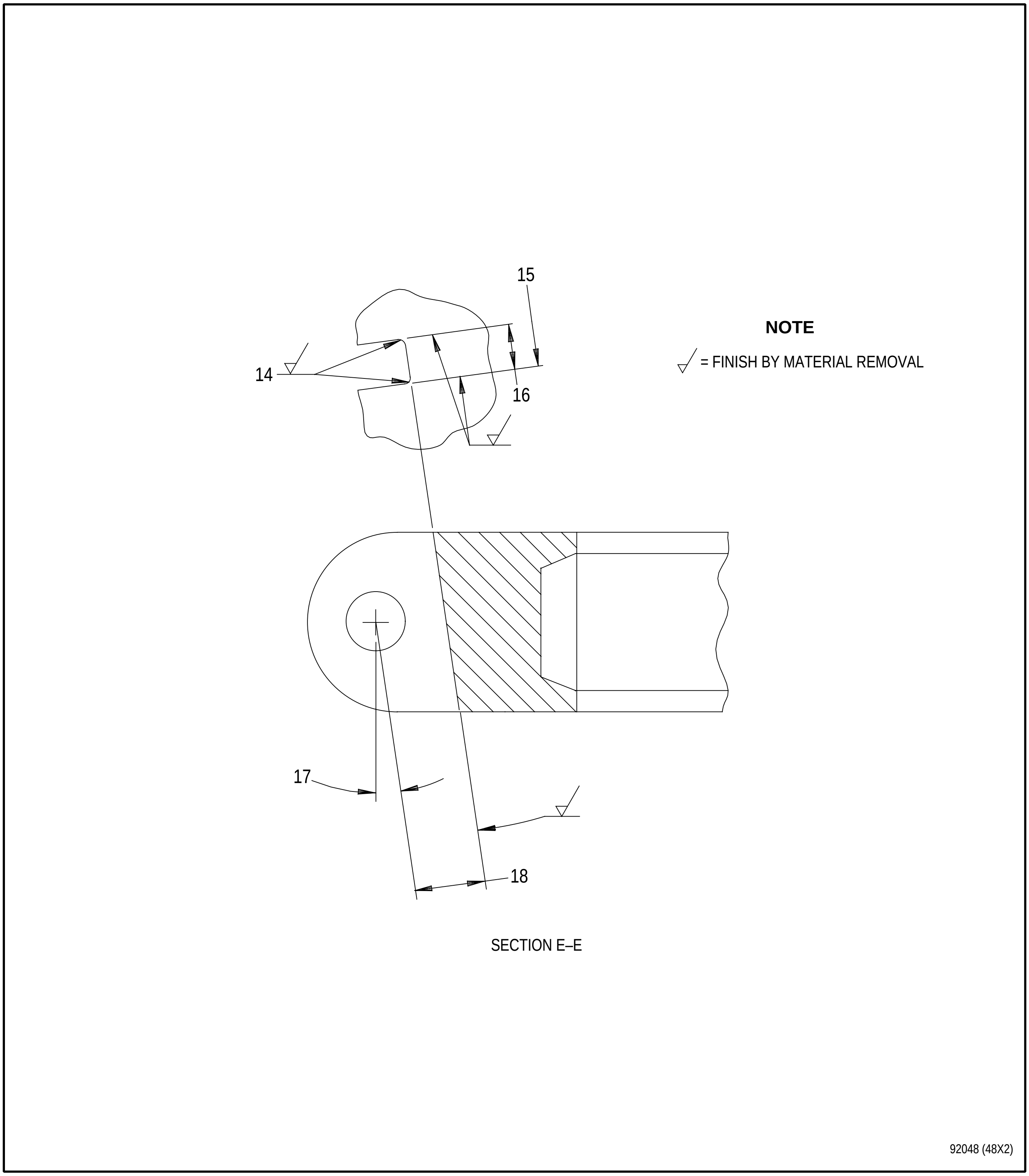


Figure 12. Augmentor Divergent Nozzle Segment Assembly (Typical PN 4071142) - Forward Hinge Notch and Center Slot Wear Puddle Weld Repair (Sheet 3 of 3)

Legend for figure 12

1. 12.678 inches
2. 18.715 to 18.825 inches
3. 20.610 to 20.730 inches
4. 0.095 to 0.125 inch
5. 0.095 inch minimum over Arc D, 4 places
6. 0.190 to 0.195 inch diameter, interrupted surface
7. 1.185 to 1.200 inches
8. 2.455 to 2.478 inches
9. 1.859 to 1.873 inches
10. 1.224 to 1.238 inches
11. 0.619 to 0.629 inch
12. 0.595 to 0.618 inch
13. 0.035 inch minimum, 4 places
14. Modified radius, 0.003 to 0.010 inch
15. 0.993 to 1.013 inches from Surface F
16. 0.145 to 0.160 inch
17. 8°0′±30′
18. 0.240 to 0.265 inch

11. AUGMENTOR DIVERGENT NOZZLE SEGMENT ASSEMBLY AFT HINGE - RIB CRACK REPAIR.

(See figure 1.)

CAUTION

To avoid weld contamination, do not allow fluorescent penetrant to enter honeycomb core.

a. Fluorescent penetrant inspect per SPOP 70. Refer to T.O. 2-1-111. No cracks permitted. Do not allow penetrant to enter honeycomb core.

b. Stop drill cracks up to 0.500 inch long using 0.109 to 0.141 inch diameter carbide or cobalt drill. Deburr all holes.

WORK PACKAGE

TECHNICAL PROCEDURES

NOZZLE SEGMENT, BALANCE, AUGMENTOR -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 12

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4	26	6 - 7	16	8	26
5	20			9 - 12 Added	26

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Introduction and General Information	T.O. 2J-F100-53-1
Qualified Repair Source List (QRSL) Augmentor Duct and Nozzle Module	WP 606 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ALUMINUM OXIDE	60 GRIT
ANTIGALLING COMPOUND	PWA 36545-3
ISOPROPYL ALCOHOL	PMC 9094
TAPE	PMC 4235
TAPE	PMC 4237

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor balance nozzle segment.

2. AUGMENTOR BALANCE NOZZLE SEGMENT ASSEMBLY - BLEND REPAIR

(See Figure 1.)

a. Blend repair wear areas noted in figure 1 as follows:

(1) If Gaspath Sheet is to be blended, strip PWA 53-5 plasma spray coating per appropriate paragraph in this work package.

(1a) All damage shall be blended using fine files and stones. Refer to T.O. 2-1-111, Section XI. Remove all pickup and raised metal. Do not exceed repairable limits per WP 315 00.

(2) Blend shall be smooth and continuous. The width to depth ratio of the blended area shall be 15 to 1.

(3) Surface finish of all blends shall be as smooth as or smoother than adjacent non grit blasted surfaces.

(4) Fluorescent penetrant inspect per SPOP 62. Refer to T.O. 2-1-111. No cracks allowed.

(5) Clean balance segment. Use SPOP 208 or equivalent. Refer to T.O. 2-1-111.

(6) Apply PWA 53-5 plasma spray coating per appropriate paragraph in this work package.

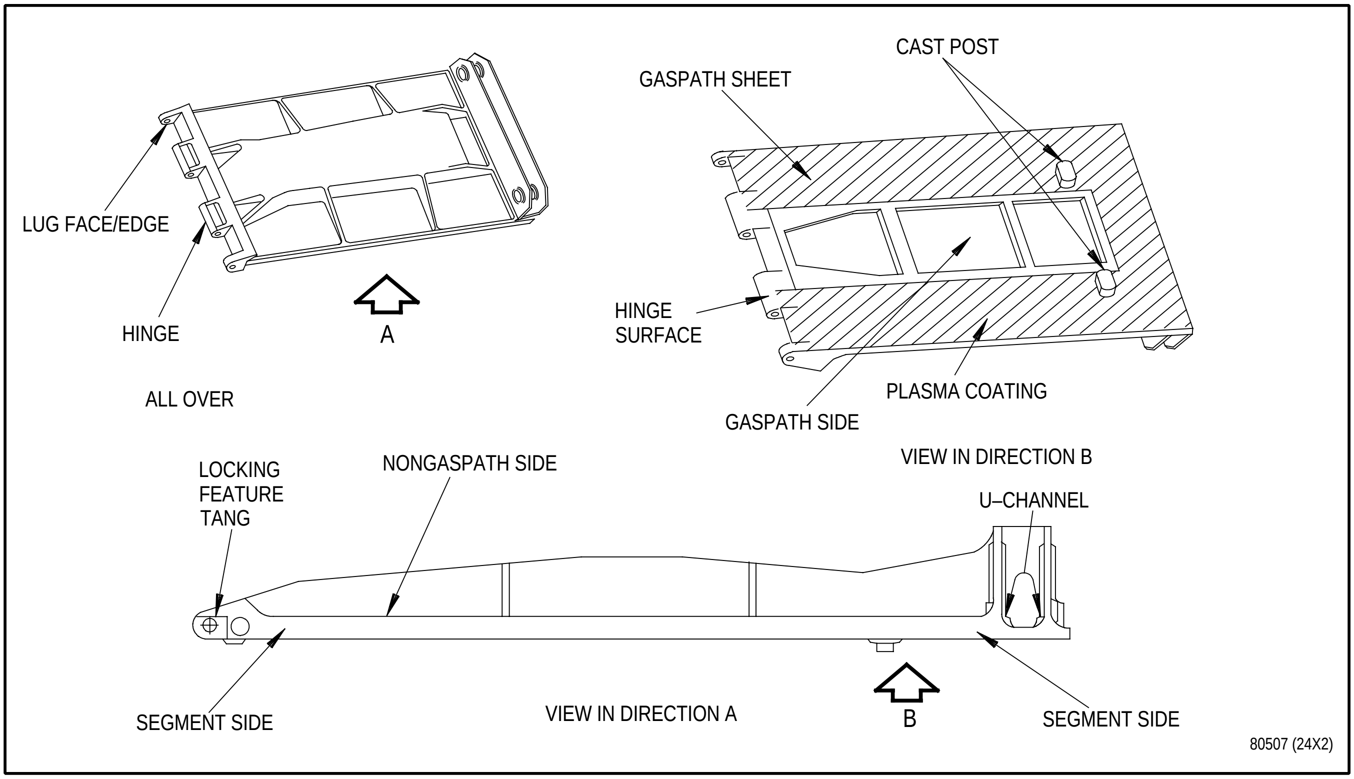


Figure 1. Augmentor Balance Nozzle Segment Assembly - Blend Repair Areas (Sheet 1 of 2)

Figure 1. (Sheet 2 of 2) Deleted.

3. AUGMENTOR BALANCE NOZZLE SEGMENT ASSEMBLY - PLASMA COATING REPLACEMENT.
(See Figures 2 and 3.)

NOTE

- Depot process orders or quality plans are required for this plasma spray application. Refer to T.O. 2J-F100-53-1, SWP 096 01.
- Two coatings are acceptable, PWA 53-1 and PWA 256-1. PWA 256-2 is Source Approved. Refer to T.O. 2-1-111, Section I, for approved source and application procedures.

a. Mask areas not being stripped with PMC 4235 and PMC 4237 tape or equivalent. See figure 2. Refer to T.O. 2-1-111, Section XIX.

b. Strip antigallant (if present) and hardcoat by grit blasting per SPOP 218 using 60 grit aluminum oxide. Refer to T.O. 2-1-111, Section III.

c. Remove masking.

d. Hand blend raised material and sharp edges in finger seal wear area on gaspath facesheet per this WP, if required.

e. Clean segment per SPOP 208, method A. Refer to T.O. 2-1-111, Section III.

f. Select coating to be applied and refer as follows:

(1) If PWA 256-1 is selected, refer to T.O. 2-1-111, Section I, for approved source and continue with step 3.k.

(2) If PWA 53-1 is selected, refer to T.O. 2-1-111, Section XIX, and continue with step 3.g.

g. Mask areas not being coated with PMC 4235 and PMC 4237 tape or equivalent. See figure 2. Refer to T.O. 2-1-111, Section XIX.

h. Grit blast coat area per SPOP 170. Refer to T.O. 2-1-111, Section XIX.

NOTE

Apply coating as soon as possible after cleaning preferably within 2 hours.

i. If surface of grit blasted part becomes contaminated with dust, fingerprints, or oil, solvent wipe part per SPOP 208. Refer to T.O. 2-1-111, Section III.

j. Replace mask as required.

k. Apply coating, thickness is 0.004 to 0.006 inches in area W and 0.004 to 0.006 inches in area Z. See figure 2 and view G. Refer to T.O. 2-1-111, Section XIX.

l. Remove mask.

m. Wipe part using cloth moistened with isopropyl alcohol, PMC 9094, to remove tape residue, as required.

n. Inspect segment for correct coating application. Refer to T.O. 2-1-111, Section XIX, for quality requirements.

o. Apply PWA 36545-3 antigalling compound to area AN, figure 3, per SPOP 748. Refer to T.O. 2-1-111, Section XXI.

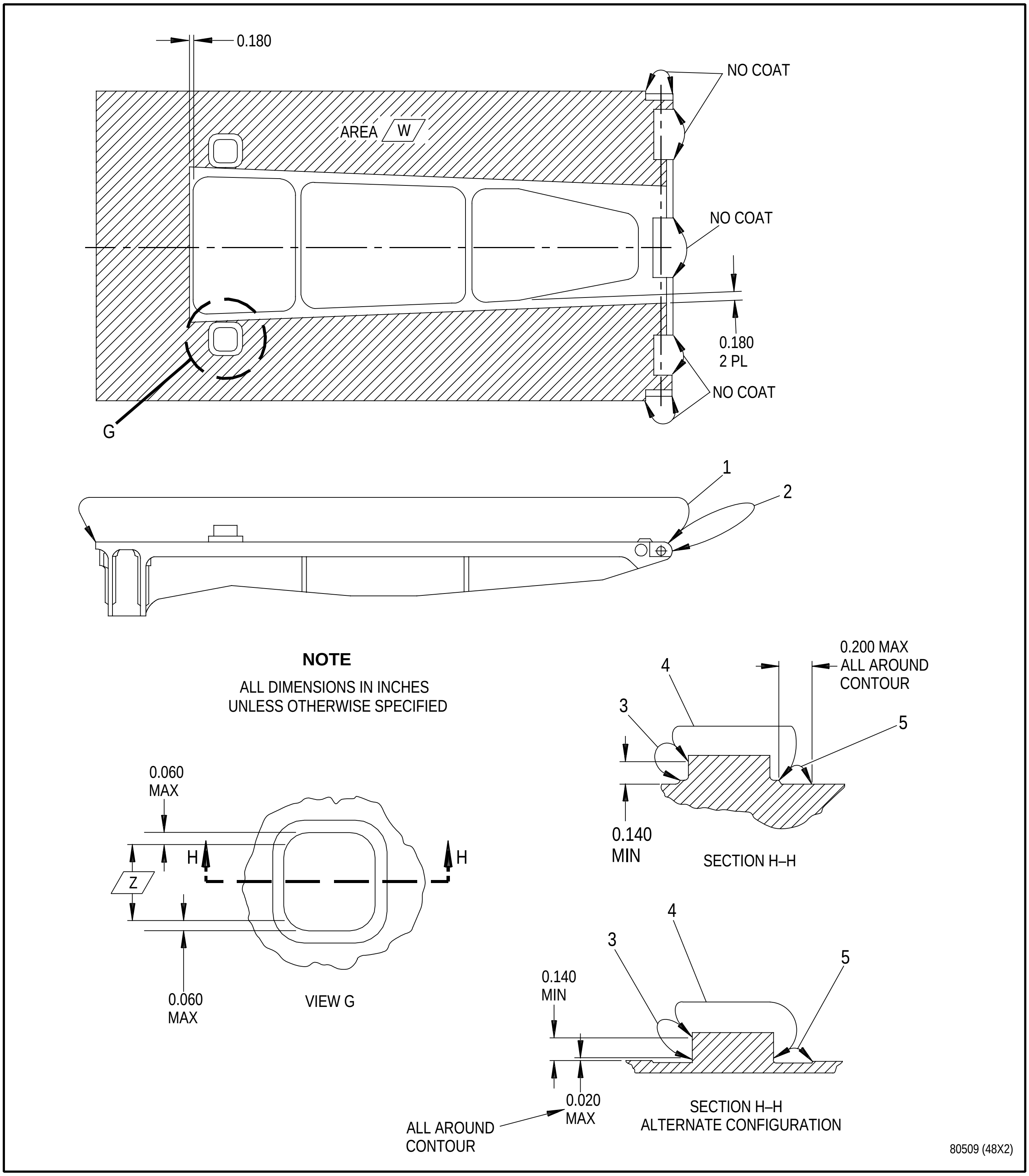


Figure 2. Augmentor Balance Nozzle Segment Assembly Repair - Plasma Spray

Legend for figure 2

1. 0.004 to 0.006 inch thick to shaded area W only
2. Coat is optional and may be incomplete.
3. 0.004 to 0.006 inch thick over distance Z
4. Coat is optional and may be incomplete all around contour unless otherwise specified.
5. Coat is optional and may be incomplete. Overlapping of coatings permissible in this area.

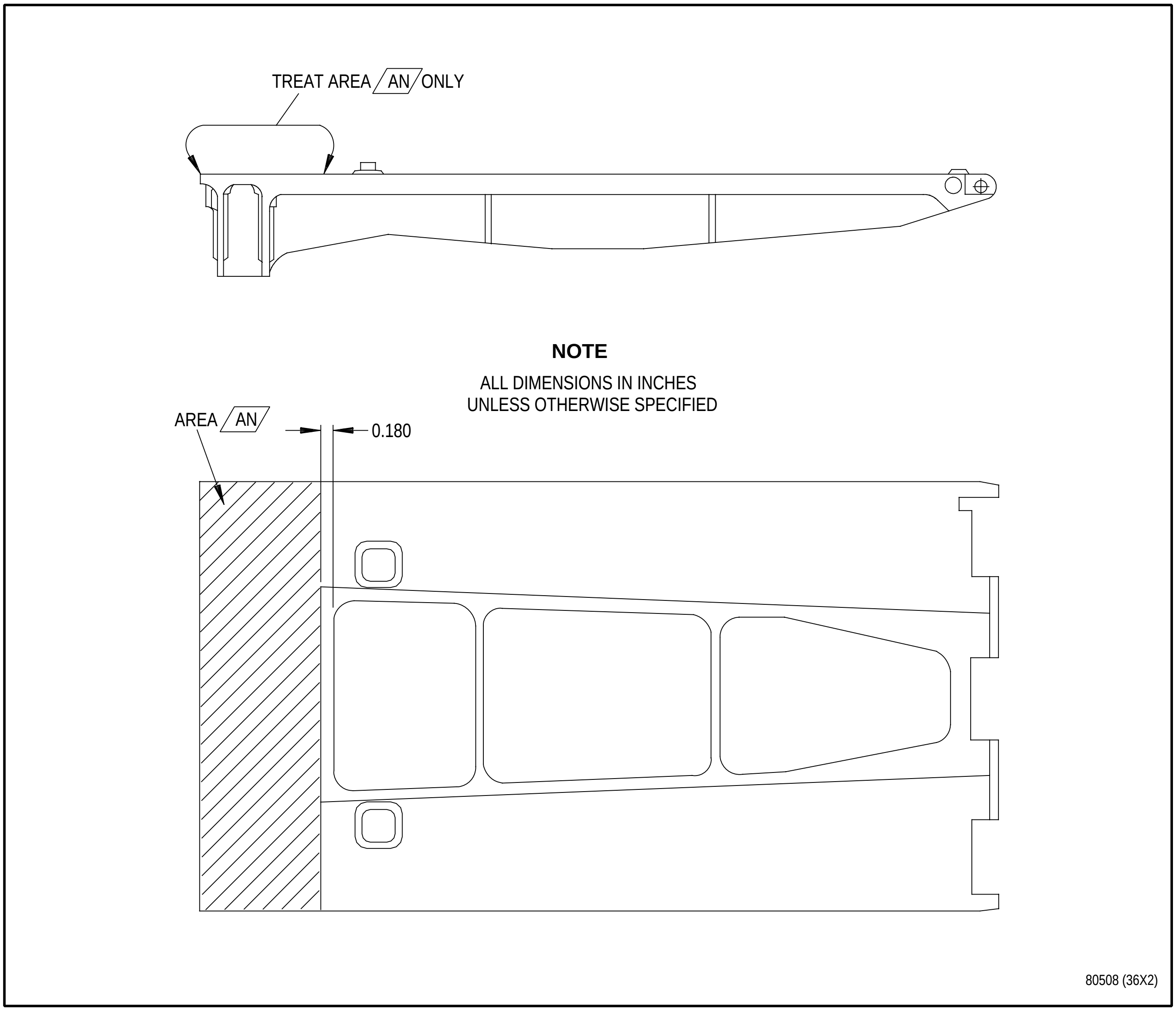


Figure 3. Augmentor Balance Nozzle Segment Assembly Repair - Antigalling Compound Application

4. AUGMENTOR CAST BALANCE NOZZLE SEGMENT ASSEMBLY-WELD REPAIR
(See Figures 4 and 5)

CAUTION

Failure to use an approved source for this repair may result in a nonserviceable part.

NOTE

- This repair is proprietary. Proprietary repairs may be performed only by qualified repair sources identified in Qualified Repair Source List (QRSL).
- An approved source list and information on becoming a qualified source can be obtained by contacting the cognizant USAF F100 Engineering Source Authority at the address listed in T.O. 2J-F100-53-1, WP 600 00.
- Vendor repair procedure listed in QRSL must be kept current by incorporation of all T.O. changes that affect the repaired part. If the vendor procedure listed in QRSL requires revision to comply with T.O. changes, or if vendor wishes to revise procedure, vendor must notify SA-ALC/LPFE of the need for revision. SA-ALC/LPFE will authorize Pratt & Whitney to coordinate directly with the vendor for review and update of the Procedure/Revision listed in the QRSL.

a. Refer to T.O. 2J-F100-53-1, WP 606 00 for a list of sources for this repair. The Distress Mode Codes for the cast balance nozzle segment assembly are:

(1) JGDFGAG Hinge hole elongation

(2) JGDFGAH Aft hinge wear

(3) JGDFGAK Post wear

(4) JGDFGZB Cracks on segment side

b. Ensure that repaired part meets final dimensions per figure 5.

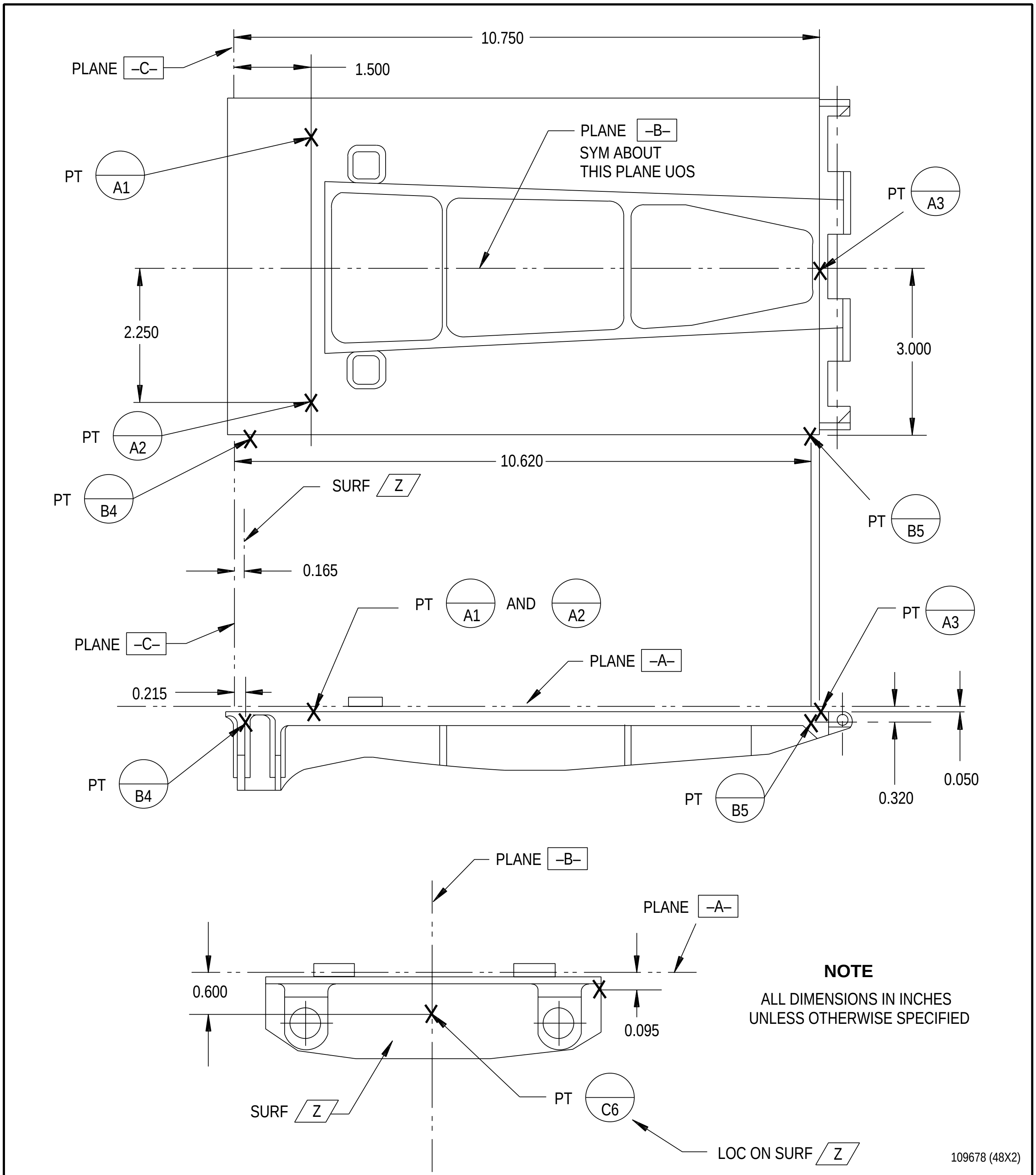
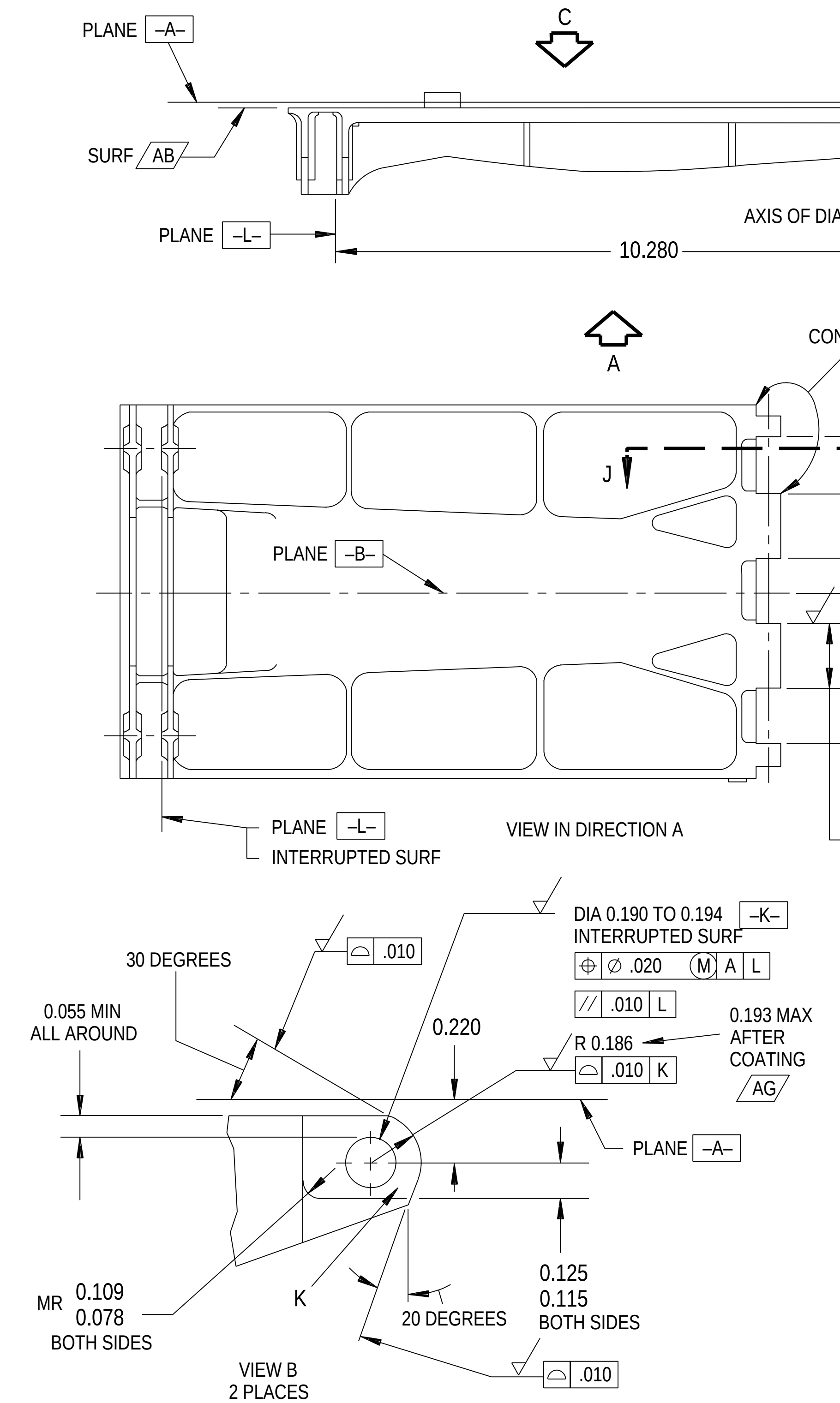


Figure 4. Augmentor Cast Balance Nozzle Segment Assembly Repair - Machining Datum Point Locations and Planes



NOTE

- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED
- UNLESS OTHERWISE SPECIFIED BREAK EDGES 0.003 TO 0.015
- √ FINISH BY MATERIAL REMOVAL
- 0.000 TO 0.003 BELOW PARENT MATERIAL MISMATCH PERMISSIBLE ALL AROUND CONTOUR X 3 PLACES
- 0.000 TO 0.005 ABOVE PARENT MATERIAL MISMATCH PERMISSIBLE ALL AROUND SURFACE Y 2 PLACES
- UNLESS OTHERWISE SPECIFIED ⌓ .010
- 0.000 TO 0.005 ABOVE PARENT MATERIAL MISMATCH PERMISSIBLE ON SURFACE AB

Figure 5. Augmentor Cast Balance Nozzle Segment Assembly Repair - Machining Dimensions (Sheet 1 of 3)

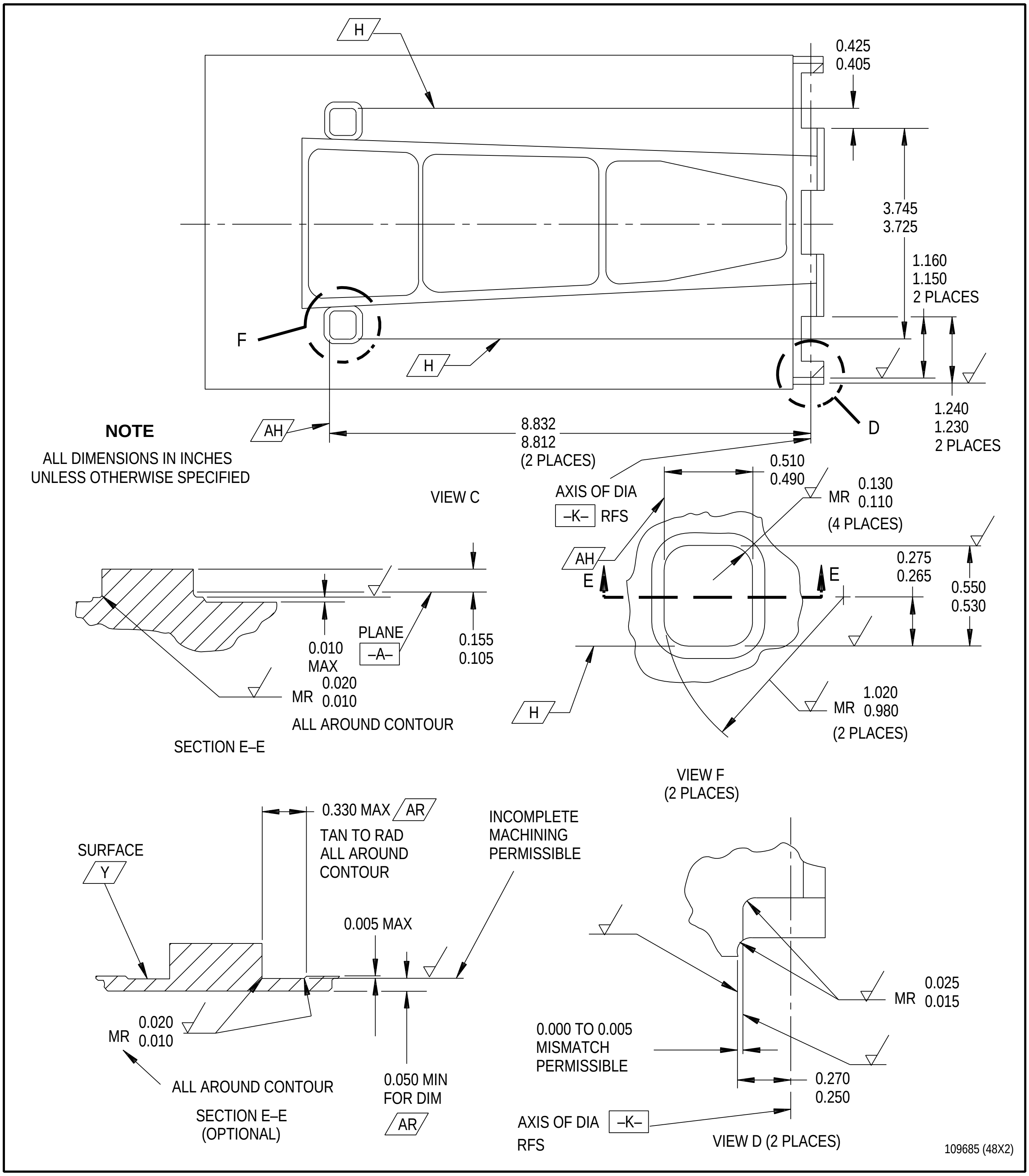


Figure 5. Augmentor Cast Balance Nozzle Segment Assembly Repair - Machining Dimensions (Sheet 2 of 3)

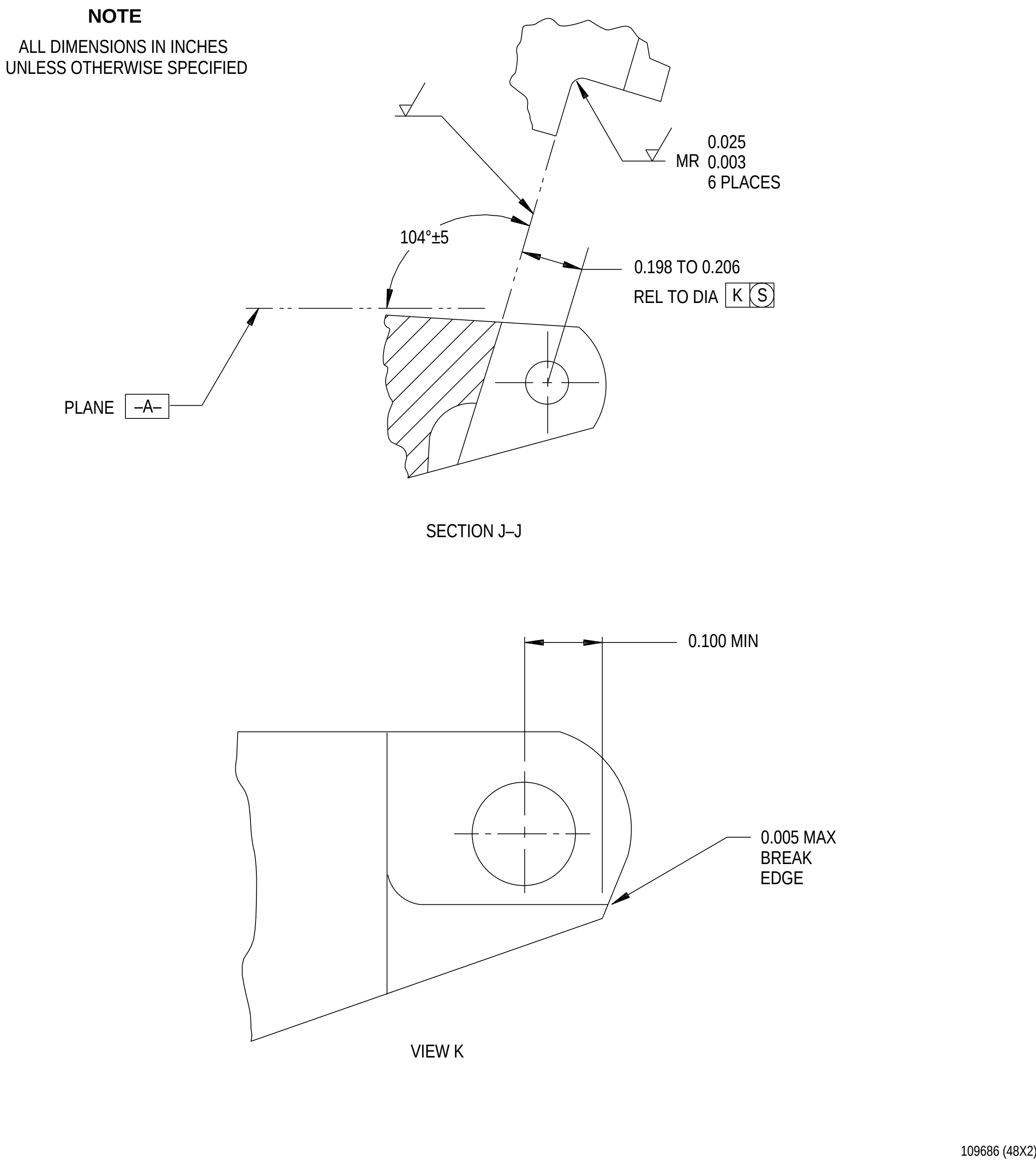


Figure 5. Augmentor Cast Balance Nozzle Segment Assembly Repair - Machining Dimensions (Sheet 3 of 3)

WORK PACKAGE

TECHNICAL PROCEDURES

NOZZLE SEGMENT, EXTERNAL, AUGMENTOR -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 14

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 13	12				
14 Blank	12				

REFERENCE MATERIAL REQUIRED

Title	Number
Introduction and General Information	T.O. 2J-F100-53-1
General Repair Procedures - Composite Repair Procedures, General	WP 099 00
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Nozzle Segment, External, Augmentor - Inspection	WP 332 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Alcohol, isopropyl (PMC 9094)	TT-I-735
Alcohol, methyl	O-M-232
Bag, plastic	-
Cloth, dry, lint-free	-
Diaphragm Material	GC 10-31
Fabric, Carbon Fiber, Polyimide Resin Impregnated (PWA 36425)	Cycom 3006GEF 3135-H8 or CPI 2237/Celion 3K8HS or HMF2406/66C or F262
Glass Fabric	Bleeder lease "C"
Gloves, Lint-Free	Nylon, Style No. 4312
Heater Blanket	CRS 3010 single ply, silicone, 220V 350W with 16 inch leads
KAPTON film	Thermalimide 0.002 inch
KAPTON tape	AIRKAP T.T tape
Non-porous TEFLON	Non-porous - 234 TFNP
Porous TEFLON	Release Ease 0.003 inch 234 TPP
Preformed Packing	3/8 inch BUNA N
Stainless Steel Tape	0.010 inch shim stock
Thermocouple	A4-2x28 inch with style 9 termination, 28 gage wire with flattened bead.

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2,3,4	Augmentor External Nozzle Segment Assembly - Composite Repair	
	Curing System ------------------------------	CRS 2000

ILLUSTRATED SUPPORT EQUIPMENT

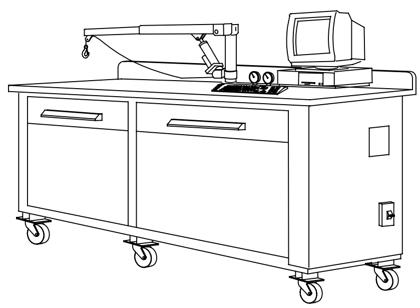

CRS 2000 –C

Figure T1. CRS 2000 Curing System

1. INTRODUCTION.

a. This work package contains instructions for repair of composite augmentor external nozzle segment assembly.

2. AUGMENTOR EXTERNAL NOZZLE SEGMENT ASSEMBLY - SURFACE DAMAGE.

(See Figure 1.)

a. Install flap in suitable holding fixture.

b. Using abrasive cloth or stone, remove all loose and/or broken composite material from damage area. Blend to smooth transition with original surface. Maximum blend depth allowed is 0.018 inch.

c. Remove all gloss surface finish from around damage area a minimum of 0.300 inch distance.

d. Check blended area to ensure repair will not violate inspection no-repair areas.

NOTE

Clean lint-free gloves are worn for handling parts after cleaning. A plastic bag is used for protection to prevent surface contamination.

e. Wipe clean using methyl alcohol or isopropyl alcohol.

f. Measure maximum depth of blended area.

(1) Divide depth by 0.013 to determine number of prepreg layers needed to fill blended area.

(2) Round-off to next lower number when calculation results in fractional number.

WARNING

Methylene Dianaline (MDA) is a known carcinogen and is an irritant to skin, eyes, and respiratory system. Vapors from uncured resin and dust generated during machining operations are slightly flammable. MDA produces toxic gasses when burned. Carbon fibers are electrically conductive and present an electrical shock hazard. Keep ignition sources away, provide adequate ventilation, prevent accumulations of graphite dust in the work area and electrical equipment, follow special handling/cleanup procedures, and wear protective clothing/ equipment.

NOTE

The following steps are performed in a controlled environmental room reserved for lay-up of composite material.

g. Cut PWA 36425 fabric into patches that represent geometry of blended area. If only one ply is used, it shall overlap damaged (repair) area a minimum of 0.300 inch per step c.

h. If necessary, cut another ply from PWA 36425 to overlay repair area. This shall overlap repair outline a minimum of 0.300 inch.

i. Lay adhesive patch(es) into blended area and cover with overlay ply irrespective of orientation. It is recommended that the overlay ply edges be serrated.

j. Cover repair area with Teflon release film to protect from contamination.

k. Install into cure fixture.

(1) Remove Teflon release film from repair area.

(2) Vacuum out ceramic tool cavity, check for cracks, porous areas, etc.

(3) If required, install bottom portion of lay-up per figure 1.

(4) Install nozzle flap, taking care to properly seat in ceramic mold of CRS 2000.

(5) Attach two J type thermocouples with one to two inches of repaired area (but not upon repair) by covering thermocouples with nominal 0.500 by 0.500 inch PMR-15 patch and securing with KAPTON tape. Test thermocouples to ensure proper working conditions.

(6) Perform blanket electrical continuity check before further assembly to ensure proper operation.

(7) Continue blanket assembly lay-up per figure 1. Secure silicon blanket and leads with KAPTON tape. Assembly lay-up shall extend beyond edge of repair area a minimum of one inch.

(8) Vacuum diaphragm seal area. Seal shall be free of all contaminates to ensure vacuum seal.

(9) Ensure all thermocouples and electrical connections are properly made and protected. If necessary, a stainless steel foil guard may be placed between flap and electrical wires to provide support.

(10) Install diaphragm and secure with hold down ring. Inspect for excessive wrinkles or improper seating of material.

(11) Secure with lock down bolts.

(12) Check clearance of blanket assembly by placing straight edge across preformed packing seals parallel to blanket assembly. A minimum clearance of approximately 0.100 inch shall be evident.

(13) Check vacuum integrity with computer ’VAC Check’ program. A vacuum level of 27 inches shall be achieved in 60 to 90 seconds. If vacuum level not achieved in 90 seconds, remove diaphragm and inspect for location of possible leak(s) in seal area.

(14) Wipe preformed packing with clean cloth.

(15) Install curing fixture lid and secure with hold down bolts. Torque evenly 240 to 360 pound-inches. Check torque after securing all bolts due to flattening of preformed packing.

(16) Connect high pressure line to fitting on lid.

l. Cure part in CRS 2000.

m. Remove flap from cure fixture and remove PMR-15 patch covering thermocouples.

n. Visually inspect repair per WP 332 00.

o. Sonic inspect repair area per paragraph 6.

p. If necessary, finish part to remove excess resin and rough edges.

3. AUGMENTOR EXTERNAL NOZZLE SEGMENT ASSEMBLY - HOLE REPAIR.

(See figure 1.)

a. Install flap in suitable holding fixture.

b. Using brad point composite drill bit (0.500 inch maximum), drill to remove damage material from flap. This will create a hole in the flap passing completely through all layers of composite material.

NOTE

Use of tooling to create scarf angle or use of template of required angle is permissible.

c. On convex (outer surface) side of flap, machine sand, or grind to enlarge hole and produce scarf zone at scarf angle of 12 to 16 degrees (4.7:1 to 3.5:1 scarf ratio) while ensuring scarf zone does not extend into no-repair area as defined in inspection work package. Size of top of scarfed hole shall be approximately 3.5 to 4.7 times diameter of bottom hole (initial hole drilled).

d. Remove all gloss surface finish from around scarfed hole a minimum of 0.300 inch distance. Remove gloss from concave side of hole a diameter that will match size of repair area on convex surface.

e. Check blended area to ensure repair will not violate inspection no-repair areas and additional damage has not occurred during scarfing operation.

NOTE

Clean lint-free gloves are worn for handling parts after cleaning. A plastic bag is used for protection to prevent contamination of surfaces.

f. Wipe clean using methyl alcohol or isopropyl alcohol.

g. Measure thickness of material adjacent to repair area. Divide thickness by 0.013 inch to determine number of prepreg layers needed to fill scarfed out hole. Round-off to next lower number when calculation results in fractional number.

WARNING

Methylene Dianaline (MDA) is a known carcinogen and is an irritant to skin, eyes, and respiratory system. Vapors from uncured resin and dust generated during machining operations are slightly flammable. MDA produces toxic gasses when burned. Carbon fibers are electrically conductive and present an electrical shock hazard. Keep ignition sources away, provide adequate ventilation, prevent accumulations of graphite dust in the work area and electrical equipment, follow special handling/cleanup procedures, and wear protective clothing/ equipment.

NOTE

The following steps are performed in a controlled environmental room reserved for lay-up of composite material.

h. Using circular cutting tool, or equivalent, cut patches from PWA 36425 in increasing 0.125 inch diameter increments until number of prepreg layers needed have been created.

i. Cut two additional plies from PWA 36425 to overlay repair area. These patches shall be a minimum of 0.300 inch larger than maximum diameter of repair hole. It is recommended that the overlay ply edges be serrated.

j. Lay prepreg patches into scarfed out hole and cover with overlay plies irrespective of orientation.

k. Place overlay ply on both sides of repair area.

l. Cover repair area with Teflon release film to protect from contamination.

m. Install into cure fixture.

(1) Remove Teflon release film from repair area.

(2) Vacuum clean ceramic tool cavity, check for cracks, porous areas, etc.

(3) Install lower side of assembly lay-up per figure 1. Assembly lay-up shall extend a minimum of one inch beyond repair area.

(4) Install nozzle flap, taking care to properly seat in ceramic mold of CRS 2000.

(5) Attach two J type thermocouples within one to two inches of repaired area (but not upon repair) by covering thermocouples with nominal 0.500 by 0.500 inch PMR-15 patch and securing with KAPTON tape. Test thermocouples to ensure proper working conditions.

(6) Perform blanket electrical continuity check before further assembly to ensure proper operation.

(7) Continue blanket assembly lay-up per figure 1. Secure silicon blanket and leads with KAPTON tape. Assembly lay-up shall extend beyond edge of repair area a minimum of one inch.

(8) Vacuum diaphragm seal area. Seal shall be free of all contaminates to ensure vacuum seal.

(9) Ensure all thermocouples and electrical connections are properly made and protected. If necessary, a stainless steel foil guard is placed between flap and electrical wires to provide support.

(10) Install diaphragm and secure with hold down ring. Inspect for excessive wrinkles or improper seating of material.

(11) Secure with lock down bolts.

(12) Check clearance of blanket assembly by placing straight edge across preformed packing seals parallel to blanket assembly. A minimum clearance of approximately 0.100 inch shall be evident.

(13) Check vacuum integrity with computer ’VAC Check’ program. A vacuum level of 27 inches shall be achieved in 60 to 90 seconds. If vacuum level not achieved in 90 seconds, remove diaphragm and inspect for location of possible leak(s) in seal area.

(14) Wipe preformed packing with clean cloth.

(15) Install curing fixture lid and secure with hold down bolts. Torque evenly 240 to 360 pound-inches. Check torque after securing all bolts due to flattening of preformed packing.

(16) Connect high pressure line to fitting on lid.

n. Cure part in CRS 2000.

o. Remove flap from cure fixture and remove PMR-15 patch covering thermocouples.

4. AUGMENTOR EXTERNAL NOZZLE SEGMENT ASSEMBLY - EDGE REPAIR.

(See figure 1.)

a. Install flap in suitable holding fixture.

b. Using abrasive wheel or cloth, remove all loose and/or broken composite material from damaged edge.

(1) Inspect edge for delaminated and splintered plies. Continue material removal until all damage is removed.

NOTE

- Use of tooling to create scarf angle or use of template of required angle is permissible.
- For either method, resultant scarf includes a one inch area with additional 0.300 inch overlap area.

c. On convex side of flap, machine sand or grind scarf angle of 19:1 (3 degrees) using one of the methods given in T.O. 2J-F100-53-1, WP 099 00. If using method II, make templates 0.130 inch progressively smaller.

d. Lightly sand around repair area to remove all gloss surfaces a minimum of 0.300 inch distance away from repair edges. Lightly sand concave side to match sanded repair area on convex side.

e. Check blended area to ensure repair will not violate inspection no-repair areas and damage has not occurred during machining of scarf angle.

f. Clean repair area with methyl alcohol using clean white cloth until no discoloration of cloth is evident.

WARNING

Methylene Dianaline (MDA) is a known carcinogen and is an irritant to skin, eyes, and respiratory system. Vapors from uncured resin and dust generated during machining operations are slightly flammable. MDA produces toxic gasses when burned. Carbon fibers are electrically conductive and present an electrical shock hazard. Keep ignition sources away, provide adequate ventilation, prevent accumulations of graphite dust in the work area and electrical equipment, follow special handling/cleanup procedures, and wear protective clothing/ equipment.

NOTE

The following steps are performed in a controlled environmental room reserved for lay-up of composite material.

g. Cut four prepreg patches from PWA 36425 prepreg material in nominal 0.300 inch steps at orientation of zero. It is acceptable to cut patches extending beyond original edge profile, edge is finished machined after curing.

h. Cut two additional plies from PWA 36425 to overlay repair area. These patches shall be a minimum of 0.300 inch larger than maximum size of scarfed out area. Orientation is +45 degrees for one ply and -45 degrees for remaining ply.

i. Lay prepreg patches into scarfed out repair area in orientation and spacing determined from previous steps.

j. Place overlay ply on both sides of repair area.

k. Install into cure fixture.

(1) Remove Teflon release film from repair area.

(2) Vacuum clean ceramic tool cavity, check for cracks, porous areas, etc.

(3) Install lower assembly lay-up per figure 1.

(4) Install nozzle flap, taking care to properly seat in ceramic mold of CRS 2000.

(5) Attach two J type thermocouples within one to two inches of repaired area (but not upon repair) by covering thermocouples with nominal 0.500 by 0.500 inch PMR-15 patch and securing with KAPTON tape. Test thermocouples to ensure proper working conditions.

(6) Perform blanket electrical continuity check before further assembly to ensure proper operation.

(7) Continue blanket assembly lay-up per figure 1. Secure silicon blanket and leads with KAPTON tape. Assembly lay-up shall extend beyond edge of repair area a minimum of one inch.

(8) Vacuum diaphragm seal area. Seal shall be free of all contaminates to ensure vacuum seal.

(9) Ensure all thermocouples and electrical connections are properly made and protected. If necessary, a stainless steel foil guard is placed between flap and electrical wires to provide support.

(10) Install diaphragm and secure with hold down ring. Inspect for excessive wrinkles or improper seating of material.

(11) Secure with lock down bolts.

(12) Check clearance of blanket assembly by placing straight edge across preformed packing seals parallel to blanket assembly. A minimum clearance of approximately 0.100 inch shall be evident.

(13) Check vacuum integrity with computer ’VAC Check’ program. A vacuum level of 27 inches shall be achieved in 60 to 90 seconds. If vacuum level not achieved in 90 seconds, remove diaphragm and inspect for location of possible leak(s) in seal area.

(14) Wipe preformed packing with clean cloth.

(15) Install curing fixture lid and secure with hold down bolts. Torque evenly 240 to 360 pound-inches. Check torque after securing all bolts due to flattening of preformed packing.

(16) Connect high pressure line to fitting on lid.

l. Cure in CRS 2000.

m. Remove flap from cure fixture and remove PMR-15 patch covering thermocouples.

n. Visually inspect repair for defects per WP 332 00.

o. Sonic inspect repair area per paragraph 6.

p. Machine grind, or sand to return edge to original profile.

q. If required, finish part to remove jagged flash and resin.

5. AUGMENTOR EXTERNAL NOZZLE SEGMENT ASSEMBLY - FRAYED MATERIAL BLEND REPAIR.

WARNING

Dust generated during machining operations are slightly flammable and is an irritant to skin, eyes, and respiratory system. Carbon fibers are electrically conductive and present an electrical shock hazard. Keep ignition sources away, provide adequate ventilation, prevent accumulations of graphite dust in the work area and electrical equipment, follow special handling/cleanup procedures, and wear protective clothing/ equipment

a. Using abrasive cloth or stone, remove all loose and/or broken composite material from damage area. Blend to smooth transition with original surface. Maximum allowable blend area is 0.250 square inch.

b. Wipe clean using methyl alcohol or isopropyl alcohol.

c. Inspect repaired area per WP 332 00.

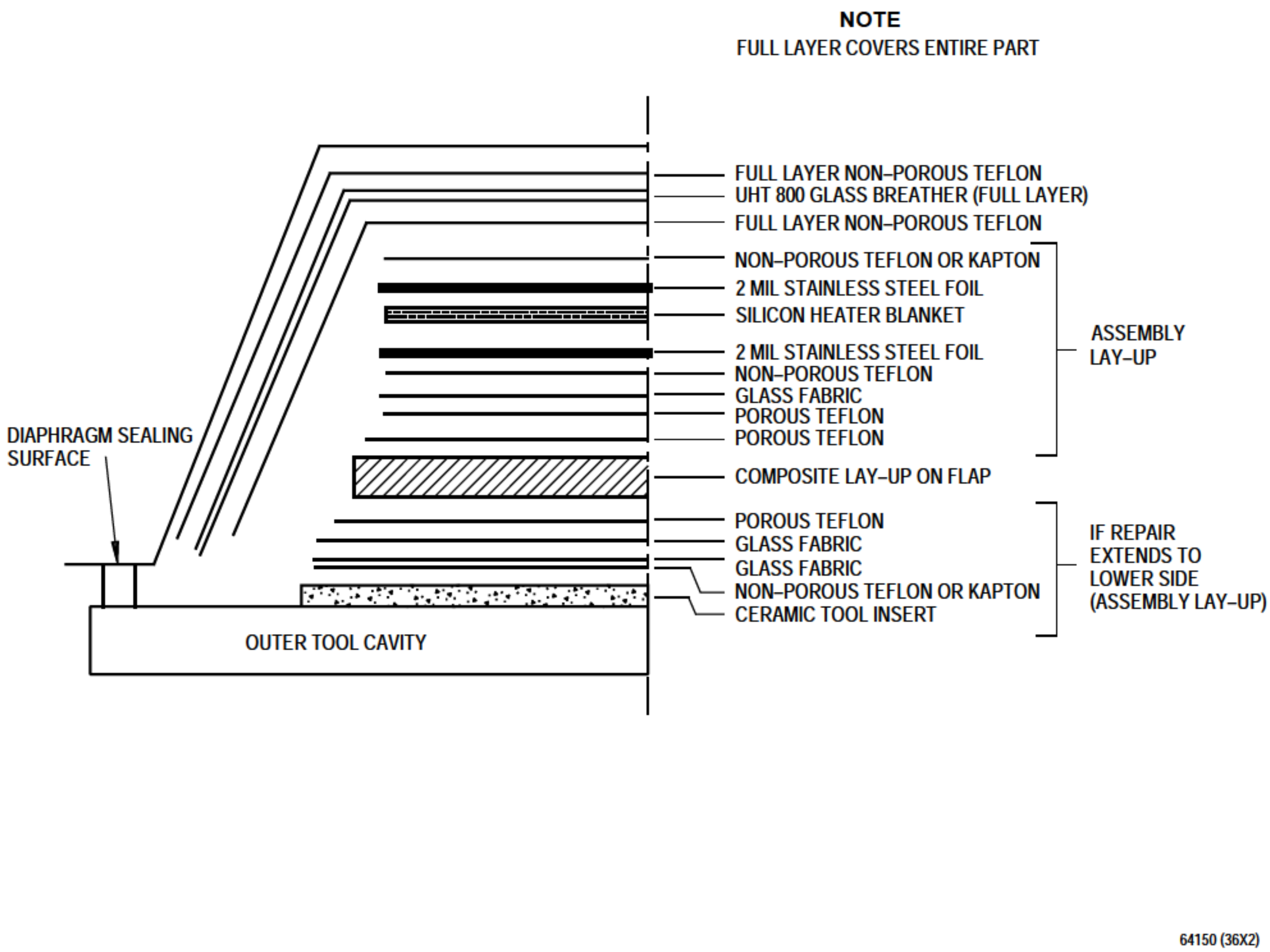


Figure 1. Blanket Lay-up Assembly

6. AUGMENTOR EXTERNAL NOZZLE ASSEMBLY - SONIC INSPECTION

(See Figure 2 and Table 1.)

a. This paragraph provides acceptance limits for repairs performed in WP 416 00.

b. Acceptance limits for Area A and C are as follows:

(1) Discontinuities which produce amplitude signals equal to or less than amplitude signal produced by a reference 3/64 inch diameter flat bottom hole (FBH) are acceptable provided discontinuity and FBH metal travel distances are comparable.

(2) When using peripheral scanning, parts containing discontinuities which produce amplitude signals exceeding background noise are unacceptable.

(3) Discontinuities which produce an average backface signal loss up to 50 percent and no acceptable signal amplitude in same area are acceptable.

(4) Discontinuities which produce an average backface signal loss up to 50 percent and an acceptable signal amplitude in same area are unacceptable.

(5) Discontinuities which produce an average backface signal loss of 50 percent or greater are unacceptable.

c. Acceptance limits for Area C as follows:

(1) Delaminations in Area C revealed by sonic inspection are acceptable within limits shown in figure 2 and table 1.

(2) Parts shall be considered acceptable provided they are within acceptable limits of figure 2.

(3) Conditions not addressed by this inspection work package are unacceptable.

Table 1. Augmentor External Nozzle Segment - Sonic Inspection Limits

Location	Maximum Size	Maximum Quantity	Minimum Separation
Area C	0.500 inch diameter	10	smaller flaw dimension

NOTE

Delaminations separated by less than the minimum required are combined and counted as one.

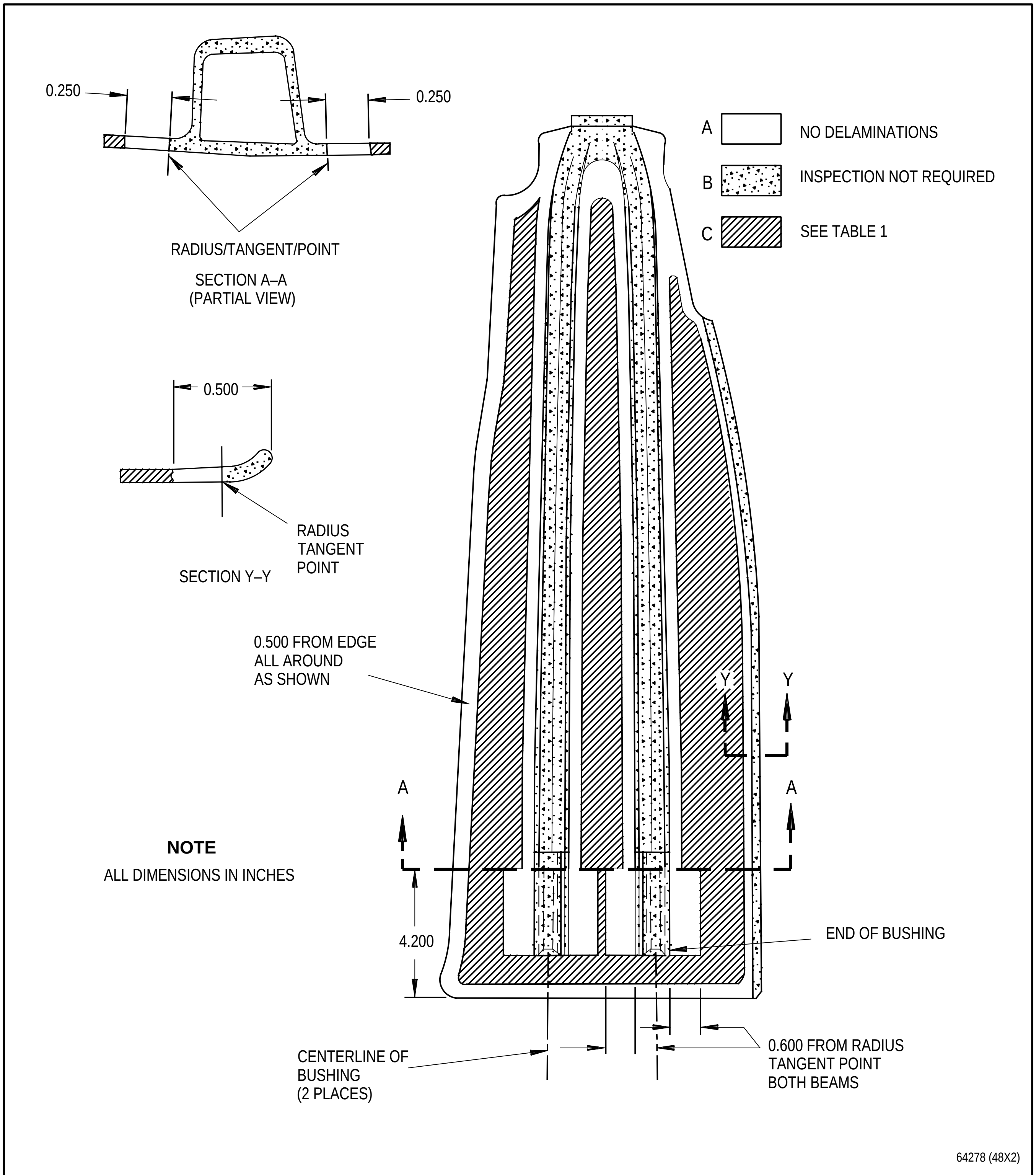


Figure 2. Augmentor External Nozzle Segment - Sonic Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

RING, SYNCHRONIZING, AUGMENTOR NOZZLE -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	9				
3	0				
4	9				
5 - 9	8				
10 Blank	8				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Nondestructive Inspection	T.O. 2J-F100-9
Introduction and General Information	T.O. 2J-F100-53-1
General Repair Procedures - Buffing, Power Denicking of Steel, Nickel, or Cobalt Parts (SPOP 533)	SWP 091 02
General Repair Procedures - Welding, Titanium Parts	WP 098 00
General Repair Procedures - Compound, Antigalling (PWA 36545), Application (SPOP 748)	SWP 098 07
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Cleaning	WP 201 00
Ring Assembly, Synchronizing, Aumentor Nozzle Inspection	WP 317 00
Augmentor Duct and Nozzle Module - Assembly of Subassemblies	WP 600 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Alcohol, isopropyl	TT-I-735
Acetone	O-A-51
Cheesecloth	CCC-C-440
Compound, antigalling (PWA 36545)	Everlube Esnalube 382

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor nozzle synchronizing ring.

2. AUGMENTOR NOZZLE SYNCHRONIZING RING ASSEMBLY - ANTIGALLING COMPOUND APPLICATION.
(See Figure 1.)

CAUTION

Do not clean or preserve coated parts with petroleum solvents or compounds. Loss of coating may result.

a. Clean part per WP 201 00.

b. Apply antigallant or dry film lubricant to areas shown in figure 1 as follows:

(1) PWA 36545. Refer to T.O. 2J-F100-53-1, SWP 098 07 (SPOP 748).

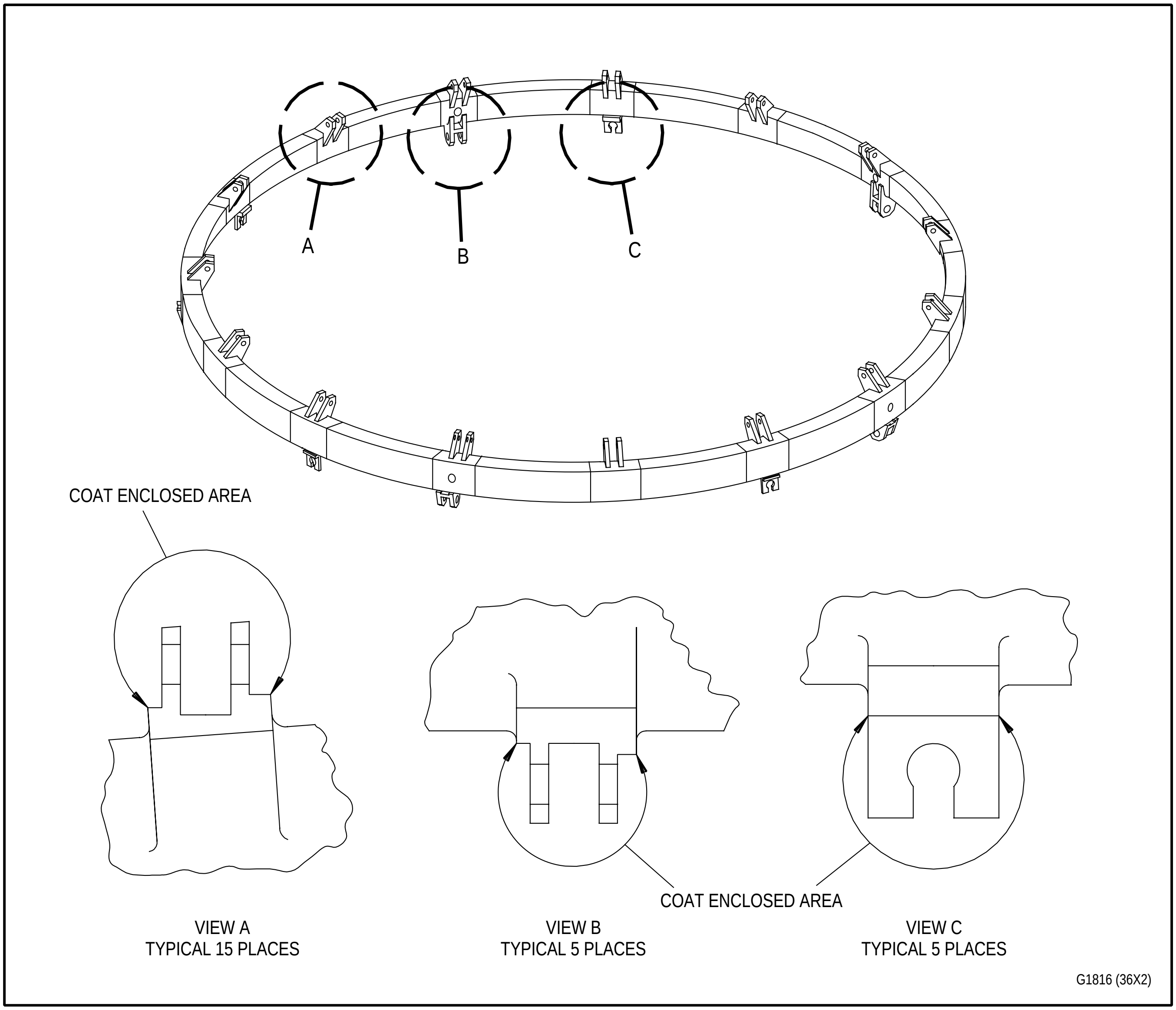


Figure 1. Augmentor Nozzle Synchronizing Ring Assembly - Antigalling Compound Application

3. AUGMENTOR NOZZLE SYNCHRONIZING RING ASSEMBLY (PN 4074229) - BLEND REPAIR OF RING

(See Figure 2.)

CAUTION

Do not clean or preserve coated parts with petroleum solvents or compounds. Loss of coating may occur.

a. Clean part as follows:

(1) Wipe with clean, unsized cheesecloth dampened with isopropyl alcohol or acetone.

(2) Air dry all traces of solvent at ambient temperature or oven dry at 250° F(121°C) maximum.

b. Blend damages as follows, refer to T.O. 2J-F100-53-1, SWP 091 02, SPOP 533.

(1) Maintain a depth to width ratio after blend of 1 to 15.

(2) Surface finish throughout the blend must conform to the surrounding unblended surface finish.

(3) A smooth contour must be maintained throughout the blend.

NOTE

Thickness of a new ring is 0.058 to 0.070 inch. To ensure ring structural integrity, measurement of ring thickness after blend repairs is required.

c. Using Panametrics 5223 ultrasonic thickness gage and M208 transducer, or approved alternate method, measure material thickness in blended areas. Minimum thickness shall be 0.048 inch in Area A, 0.038 inch in Area B and 0.055 inch in Area C.

d. Fluorescent penetrant inspect blended areas. Refer to T.O. 2-1-111, SPOP 70. Evaluate results per SFPS-M and SFPS-38 in T.O. 2-1-111.

e. Replace antigalling compound per paragraph 2.

4. AUGMENTOR NOZZLE SYNCHRONIZING RING ASSEMBLY (PN 4074229) - BLEND REPAIR OF RUBMARKS ON FORWARD MOUNTING LUGS, REAR MOUNTING LUGS AND CAM FOLLOWER BRACKETS.
(See Figure 2.)

CAUTION

Do not clean or preserve coated parts with petroleum solvents or compounds. Loss of coating may occur.

a. Clean part as follows:

(1) Wipe with clean, unsized cheesecloth dampened with isopropyl alcohol or acetone.

(2) Air dry all traces of solvent at ambient temperature or oven dry at 250° F (121°C) maximum.

b. Blend damages as follows, refer to T.O. 2J-F100-53-1, SWP 091 02, SPOP 533.

(1) Maintain a depth to width ratio after blend of 1 to 5.

(2) Surface finish throughout the blend must conform to the surrounding unblended surface finish.

(3) A smooth contour must be maintained throughout the blend.

c. Inspect blended areas per WP 317 00.

d. Fluorescent penetrant inspect blended areas. Refer to T.O. 2-1-111, SPOP 70. Evaluate results per SFPS-M and SFPS-38 in T.O. 2-1-111.

e. Replace antigalling compound per paragraph 2.

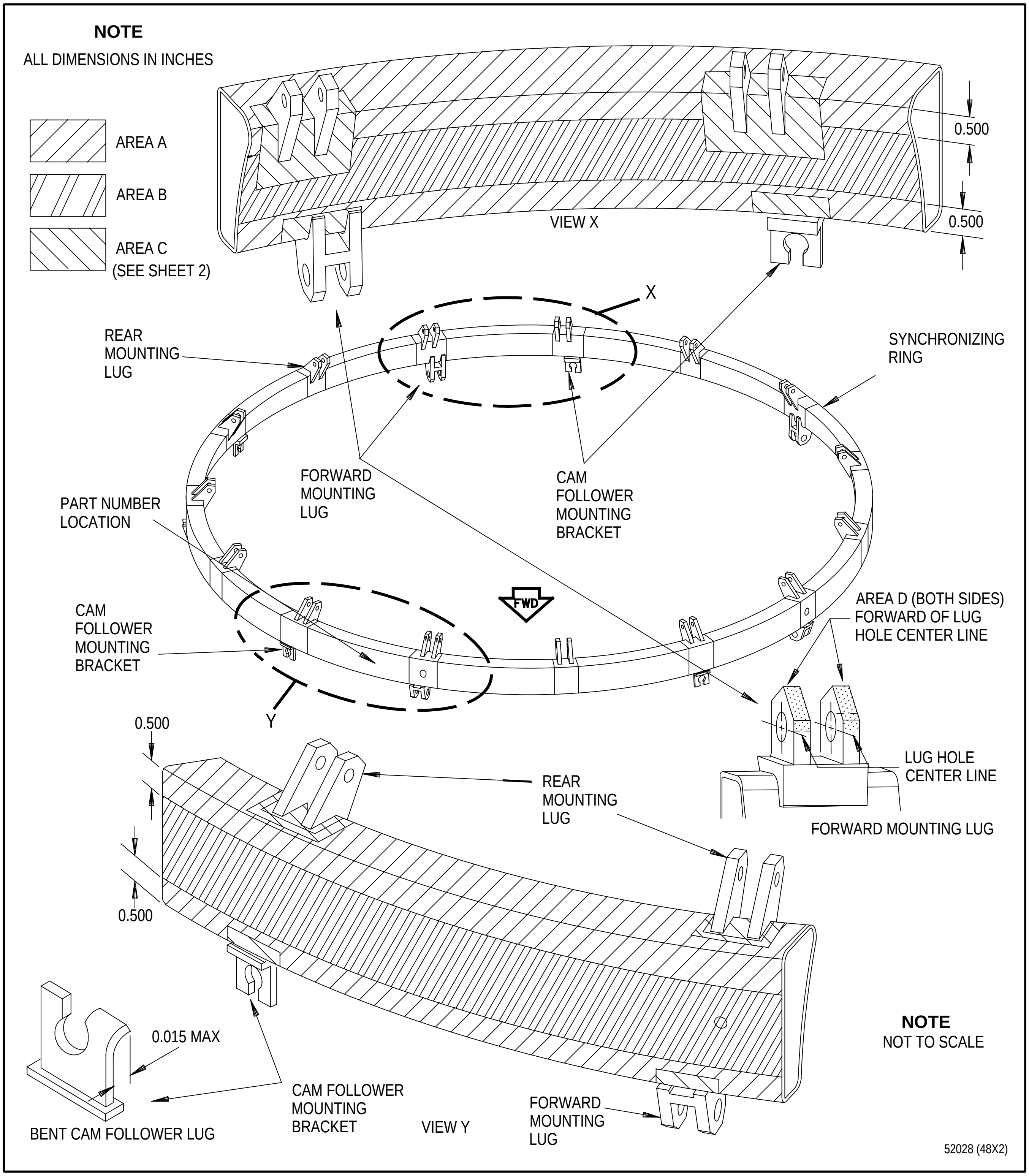


Figure 2. Augmentor Nozzle Synchronizing Ring Assembly (PN 4074229) - Repair (Sheet 1 of 3)

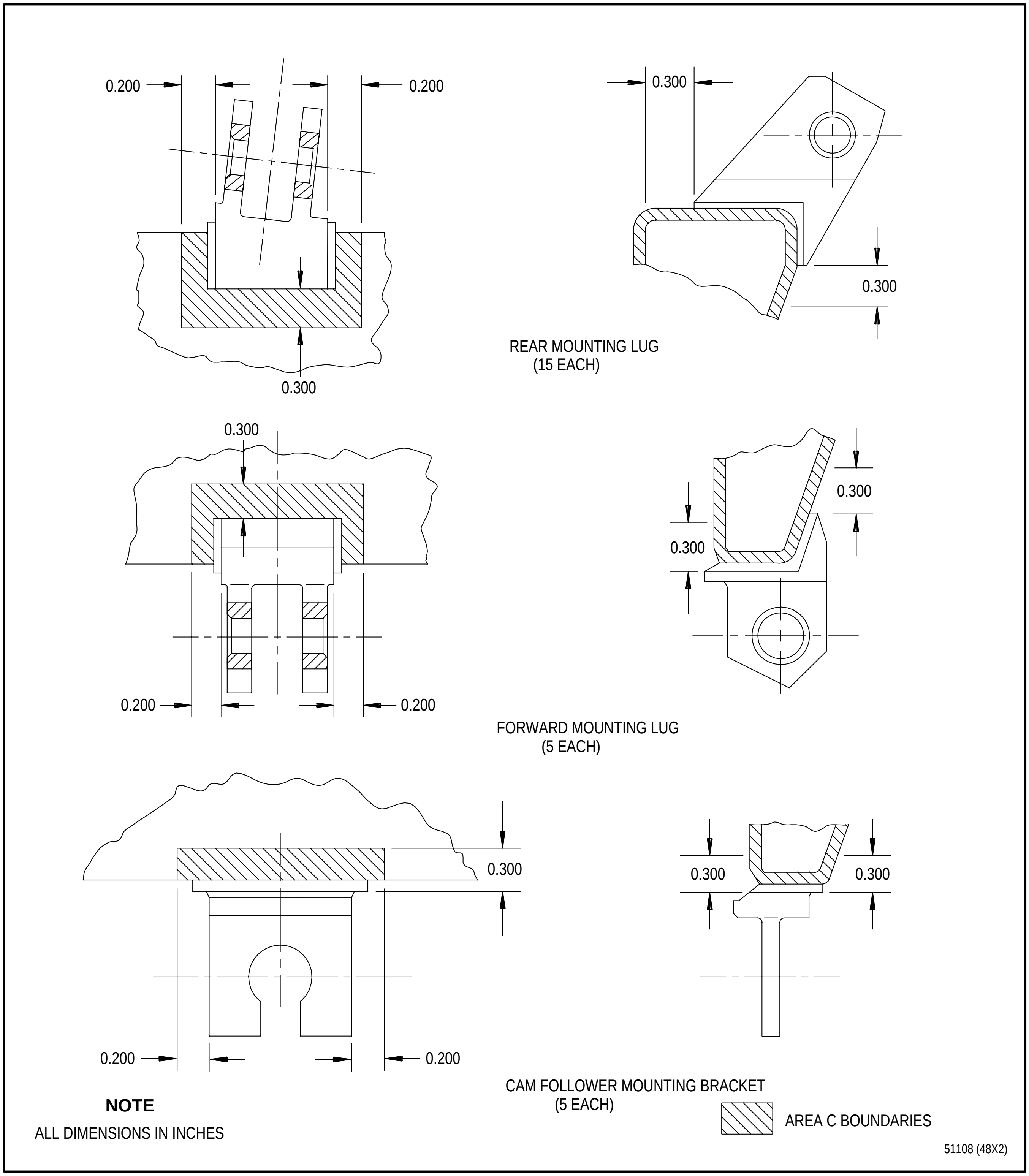


Figure 2. Augmentor Nozzle Synchronizing Ring Assembly (PN 4074229) - Repair (Sheet 2 of 3)

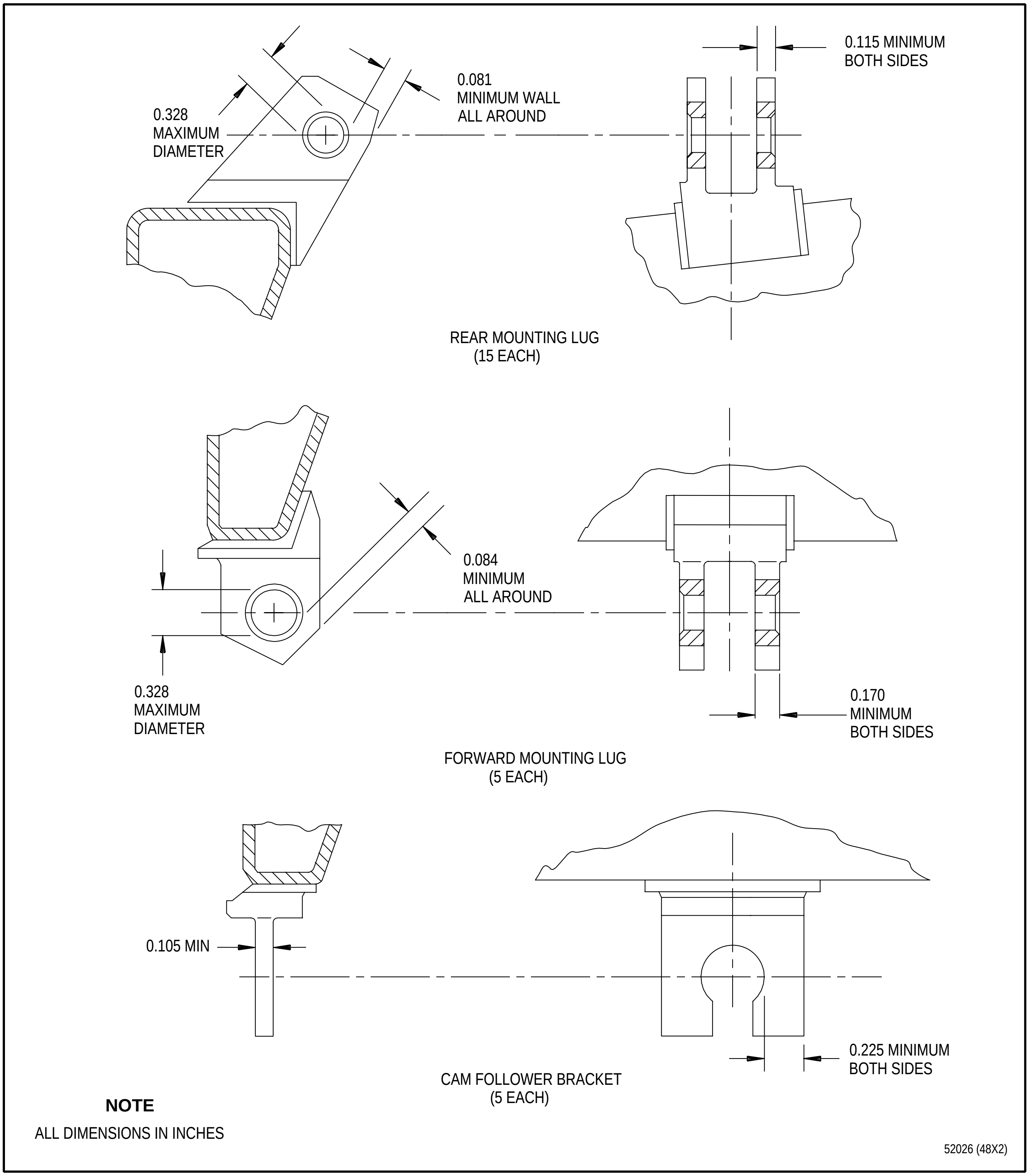


Figure 1. Augmentor Nozzle Synchronizing Ring Assembly (PN 4074229) - Repair (Sheet 3 of 3)

WORK PACKAGE

TECHNICAL PROCEDURES

CONNECTING LINK, RIGID, AUGMENTOR DIVERGENT NOZZLE -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
General Cleaning Procedures - Cleaning, Soft Grit Blast (SPOP 8)	SWP 031 05
General Repair Procedures - Welding, Inert Gas Fusion	SWP 093 01

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor divergent nozzle rigid connecting link.

2. AUGMENTOR DIVERGENT NOZZLE CONNECTING LINK - WELD REPAIR.

(See Figure 1.)

a. Clean areas to be welded using grit blast. Refer to T.O. 2J-F100-53-1, SWP 031 05 (SPOP 8), except do not oil dip.

b. Weld lug holes using GTAW and AMS 5832 welding wire. Refer to T.O. 2J-F100-53-1, SWP 093 01.

NOTE

Straighten (if necessary) before heat treating.

c. Precipitation heat treat. Refer to T.O. 2-1-111 (SPOP 465) (Cycle No. 12A).

d. Machine both ends to dimensions shown. See figure 1. Surface texture to 125AA, UOS.

e. Machine lug holes to dimensions shown.

f. Fluorescent penetrant inspect welds and repaired areas. Refer to T.O. 2-1-111 (SPOP 62). No cracks allowed.

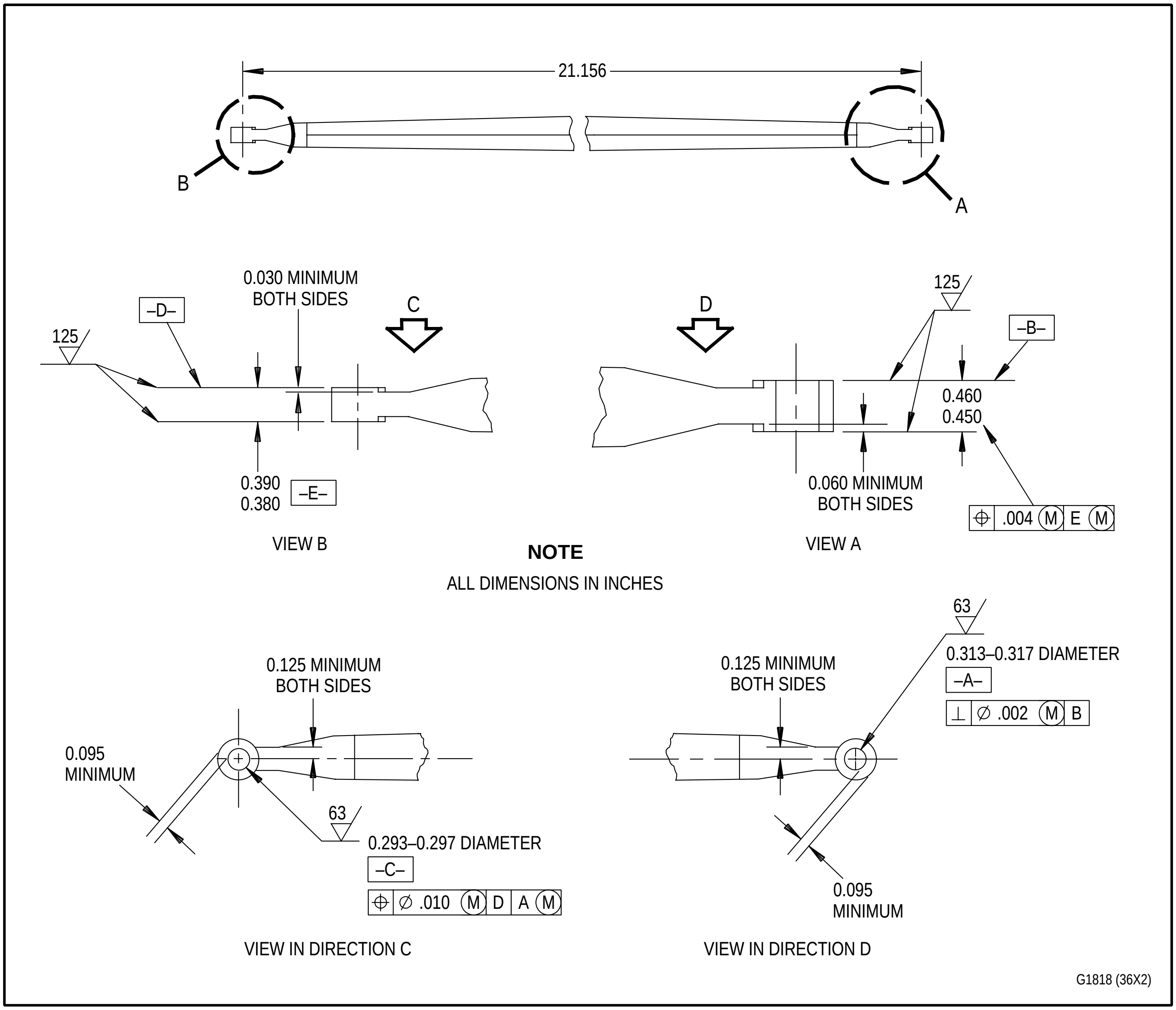


Figure 1. Augmentor Divergent Nozzle Connecting Link - Repair

WORK PACKAGE

TECHNICAL PROCEDURES

CONNECTING LINK, AUGMENTOR NOZZLE SYNCHRONIZING RING -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	9				
2 - 3	0				
4	9				
5 - 7	0				
8 Blank	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Nondestructive Inspection Procedures	T.O. 2J-F100-9
Introduction and General Information	T.O. 2J-F100-53-1
General Repair Procedures - Compound, Antigalling (PWA 36545) Application (SPOP 748)	SWP 098 07

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cloth, abrasive, crocus	P-C-458
Compound, antigalling (PWA 36545)	Everlube 382 or Kaylube No. 3
Oil, lubricating	MIL-L-7808

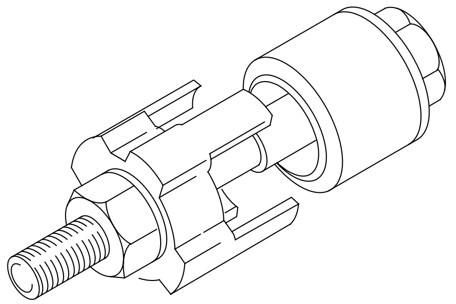
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

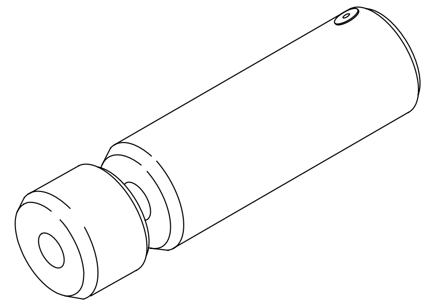
Paragraph	Function - Tool Nomenclature	Tool Number
3	Augmentor Nozzle Synchronizing Ring Connecting Link Assembly - Bearing Replacement	
	Puller, Connecting Link Bearing	PWA 50792
	Anvil, Connecting Link Bearing	PWA 50793

ILLUSTRATED SUPPORT EQUIPMENT



PWA 50792 –C

Figure T1. PWA 50792 Puller



PWA 50793 –C

Figure T2. PWA 50793 Anvil

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor nozzle synchronizing ring connecting link.

2. AUGMENTOR NOZZLE SYNCHRONIZING RING CONNECTING LINK ASSEMBLY - BLEND REPAIR.
(See Figure 1.)

a. Blending requirements are as follows:

(1) All local blending shall extend to a distance of at least 15 times depth of damage from center of blend.

(2) Surface finish of all blends shall be as smooth or smoother than original finish.

NOTE

Scoring or gouging is caused from possible interference with balance/convergent seal hinge.

b. Blend repair unserviceable scoring or gouging on concave surface as follows:

(1) Use fine stone.

(2) Remove raised metal as required.

(3) Blend repair unserviceable scoring or gouging rough surfaces.

c. Fluorescent penetrant inspect. Refer to T.O. 2J-F100-9. No cracks permitted.

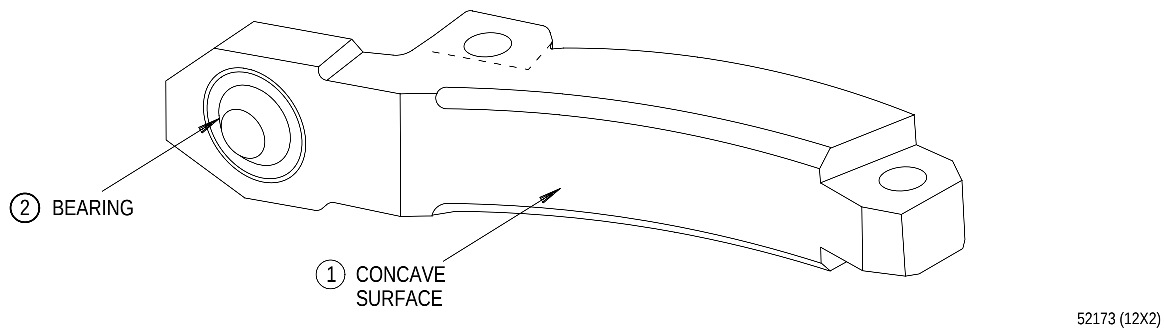


Figure 1. Augmentor Nozzle Synchronizing Ring Connecting Link Assembly - Repair

3. AUGMENTOR NOZZLE SYNCHRONIZING RING CONNECTING LINK ASSEMBLY - BEARING REPLACEMENT.

a. Preparation of new bearing.

(1) Ensure bearing is clean and free of foreign material.

(2) Lightly coat all bearing surfaces with lubricating oil. Remove excess.

(3) Place bearing in freezer for at least 20 minutes.

b. Remove damaged bearing as follows:

(1) With appropriate tooling, grind or cut flared edge of bearing on one side. Do not grind into link material when removing bearing.

(2) Install stud detail of PWA 50792 puller through smaller cup detail, and through hole in bearing, with cup against cut side of bearing.

(3) Position larger cup detail of PWA 50792 puller over hole. Secure tool using hex-head nut.

(4) Turn hex-head nut until bearing is removed from link. Disassemble tool and discard bearing.

c. Installation of new bearing.

(1) Clean bearing hole in link. Hand blend score marks in hole with P-C-458 crocus cloth.

(2) Apply light coat of lubricating oil into bearing hole in link. Wipe off excess.

NOTE

Step (3) through (6) shall be performed in rapid manner to prevent bearing from warming up.

(3) Remove bearing from freezer and install into hole in link.

(4) Install stud detail of PWA 50792 puller through smaller cup detail, through hole in bearing and through hole in assembly.

(5) Position larger cup detail of puller over hole in which bearing is to be installed. Secure using hex-head nut.

NOTE

Outer ring of bearing shall be flush to 0.010 inch above adjacent link surface.

(6) Turn hex-head nut until bearing is pulled into link. Remove puller after bearing has warmed to room temperature.

(7) Insert detail guide pin of PWA 50793 anvil through bearing, aligning bottom punch with groove in bearing race.

(8) Install detail top punch of PWA 50793 anvil over guide pin and bearing. Place assembly into arbor press and groove stake bearing race to link.

(9) Remove tooling. Inspect groove stake to requirements of T.O. 2-1-111. Use fingers to check bearing for freedom of movement. Ball shall move through ten degree minimum cone angle.

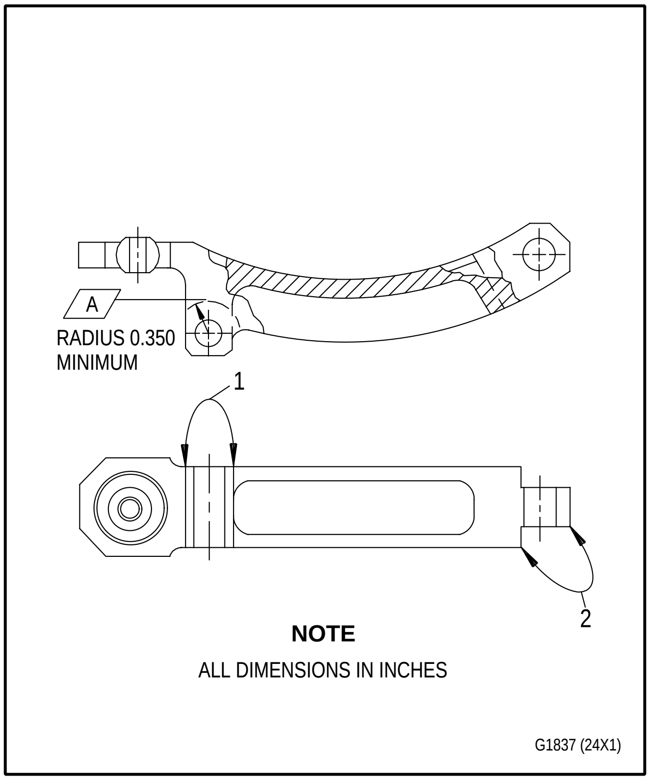
4. AUGMENTOR NOZZLE SYNCHRONIZING RING CONNECTING LINK ASSEMBLY - DRY LUBRICANT APPLICATION.
(See Figure 2.)

NOTE

Surface under antigalling compound is anodized.

a. Do not abrasive blast surface to be coated.

b. Apply PWA 36545 antigalling compound to areas shown. Do not abrasive blast surface to be coated. See figure 2. Refer to T.O. 2J-F100-53-1, SWP 098 07 (SPOP 748).



1. Coat in two places including hole over distance A.
2. Coat in two places including hole.

Figure 2. Augmentor Nozzle Synchronizing Ring Connecting Link Assembly - Dry Film LubricantApplication

WORK PACKAGE

TECHNICAL PROCEDURES

SUPPORT AND BEARING ASSEMBLY, AUGMENTOR NOZZLE -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	0				
4 Blank	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cloth, abrasive, crocus	P-C-458

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for repair of the augmentor nozzle supports.

2. AUGMENTOR NOZZLE SUPPORT AND SUPPORT BEARING - LIGHT GALLING REPAIR.

(See Figure 1.)

a. Repair serviceable light galling by removing raised metal or burrs with P-C-458 abrasive crocus cloth.

b. Ensure ‘‘D’’ hole ID of 0.628 inch maximum not exceeded.

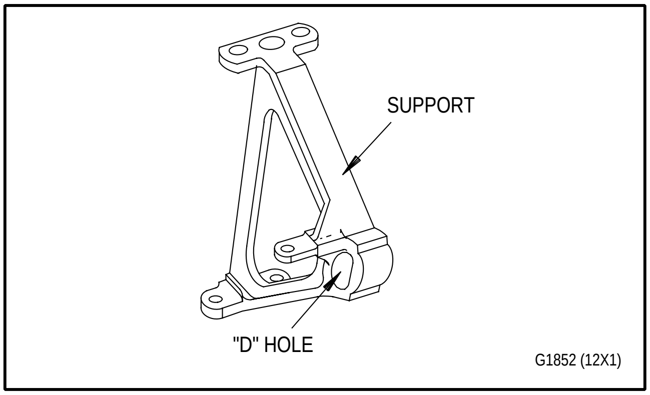


Figure 1. Augmentor Nozzle Support - Blend Repair

WORK PACKAGE

TECHNICAL PROCEDURES

SUPPORT ASSEMBLY, AUGMENTOR NOZZLE -

REPAIR

EFFECTIVITY: ENGINE MODELS F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 126

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	26	19	26	27 - 36	25
2 - 3	25	20 - 25	25	37 - 125 Added	25
4	13	26	13	126 Blank Added	25
5 - 18	25				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Nondestructive Inspection	T.O. 2J-F100-9
General Cleaning Procedures - Cleaning Steel, Magnesium or Titanium Parts, Paint and Varnish Removal (SPOP 250)	SWP 031 15
General Repair Procedures - Grinding, Blending, Lapping, Buffing, and Peening	WP 091 00
General Repair Procedures - Buffing, Power Denicking of Titanium Parts (SPOP 532)	SWP 091 01
General Repair Procedures - Grinding, Machine, of Titanium Parts (SPOP 530)	SWP 091 03
General Repair Procedures - Welding, Inert Gas Fusion	SWP 093 01
Nondestructive Inspection Methods	T.O. 33B-1-1

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T.O. No.	Date	Level	Title (ECP No.)
T.O. 2J-F100(IV)-506	30 Apr 80	O	Replacement of Augmentor Nozzle Static Structure Fairing with Contoured Cover Plates F100-PW-100 Engine (ECP 20518)

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Abrasive, Silicon Carbide Paper	No. 240 grit
Acetone	O-A-51
Alcohol, isopropyl	TT-I-735 or P-D-680, Type III
Primer, Adhesive/sealant (PWA 36047) (PN 4046892)	DC 93-076
Primer, Adhesive/sealant (PWA 556)	DC 1200
Primer, Adhesive/sealant (PWA 617 or PWA 36003-1)	RTV 159 or DC3145
Compound, Antigalling (PWA 36545)	Esnalube 382
Sermetel 406 (Orange)	PWA 499-2

CONSUMABLE MATERIALS (continued)

Nomenclature	Specification/Vendor Part Number
Sheet stock, titanium alloy	AMS 4911
0.014 to 0.018 inch thick	
0.018 to 0.023 inch thick	
0.023 to 0.027 inch thick	
0.027 to 0.031 inch thick	
0.031 to 0.036 inch thick	
0.036 to 0.044 inch thick	
0.044 to 0.050 inch thick	
0.050 to 0.060 inch thick	
0.060 to 0.070 inch thick	

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
Rivet	AN123315	As required
Rivet	AN123319	As required
Rivet	AN123336	As required
Rivet	AN123337	As required
Rivet	AN123338	As required
Rivet	AN123339	As required
Rivet	AN123399	As required
Rivet	AN123620	As required
Rivet	AN123637	As required
Rivet	MS9318-052	As required
Rivet	MS9319-004	As required
Rivet	MS9319-006	As required
Rivet	MS9319-050	As required
Rivet	MS9319-052	As required
Rivet	MS9319-098	As required
Rivet	MS9319-099	As required
Rivet	MS9319-100	As required
Rivet	MS9319-101	As required
Rivet	MS9319-102	As required
Rivet	MS9319-104	As required
Rivet	NAS9307M-4-01	As required
Rivet	NAS9307M-4-02	As required
Rivet	NAS9307M-4-03	As required
Rivet	PN 2152845	As required
Rivet	ST1173-01	As required
Rivet	ST1173-02	As required
Rivet	ST1173-03	As required

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
6	Augmentor Nozzle Support Assembly - Self-locking clinch nut replacement	
	Pusher, clinch nut -------------------------	PWA 56558 or PWA 55915

ILLUSTRATED SUPPORT EQUIPMENT

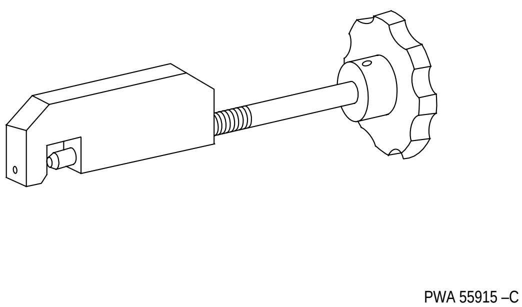


Figure T1. PWA 55915 Pusher

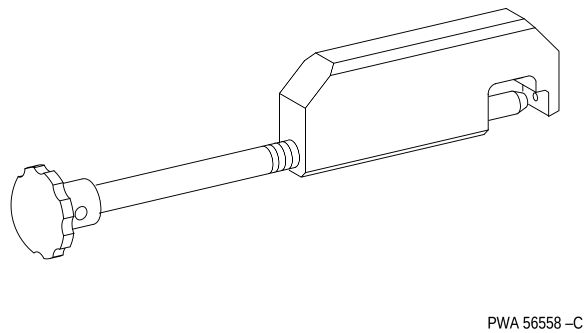


Figure T2. PWA 56558 Pusher

1. INTRODUCTION.

a. This work package contains instructions for repair of the augmentor nozzle support assembly.

b. For the repair and overhaul of USAF engines, a Depot Process Order in accordance with AFMCI 21-110 or a Quality Plan in accordance with LPF-QPR-016 is required. These documents will require approval of the cognizant design engineering function at SA-ALC/LPFE. Repair procedures are provided for the following:

Repair	Paragraph	Inspection WP 324 00 Reference Item
Skin damage repair	3	1
Repair of one line cracks (including those into stiffener weld, but not into stiffener material) and torn or deformed skin areas in panels between stiffeners	4	1
Repair of damage across skin-to-flange fusion weld	5	1
Self-locking clinch nut replacement	6	7
Antigalling compound application	7	8
Nut plate replacement	8	6
Rivet replacement	9	5
Blend repair of roller track wear and surface damage	10	4
Replacement of damaged rubstrip segments	11	8
Primer (PWA 556) and sealant (PWA 36047) use	12	N/A
Replacement of guides	13	2
Replacement of guide support brackets	14	3
Application of painted markings	15	N/A
Repair of stiffener forward end cracks at location A and B	16	10
Repair of stiffener forward end cracks at location C	17	10

Repair	Paragraph	Inspection WP 324 00 Reference Item
Repair of stiffener forward end cracks at location D	18	10
Repair of stiffener forward end cracks at location E	19	4, 10
Blend repair of edge nicks and tears around access holes	20	11
Repair of damage around nozzle support guides	21	1,11
Repair of stiffener damage underlying rubstrip	22	10
Repair of one line cracks into or through stiffener weld and stiffener material, or one line edge cracks not into stiffener weld	23	1,10
Repair of multiple skin cracks into and through stiffener leg and stiffener weld	24	1,10

2. Deleted.

3. AUGMENTOR NOZZLE SUPPORT ASSEMBLY, SKIN - DAMAGE REPAIR. (See figure 1.)

a. Repair any amount of serviceable skin dents (without cracks or breaks) by cold working into original contour.

b. Fluorescent penetrant inspect(FPI) per SPOP 70. Refer to T.O. 2-1-111. No cracks allowed.

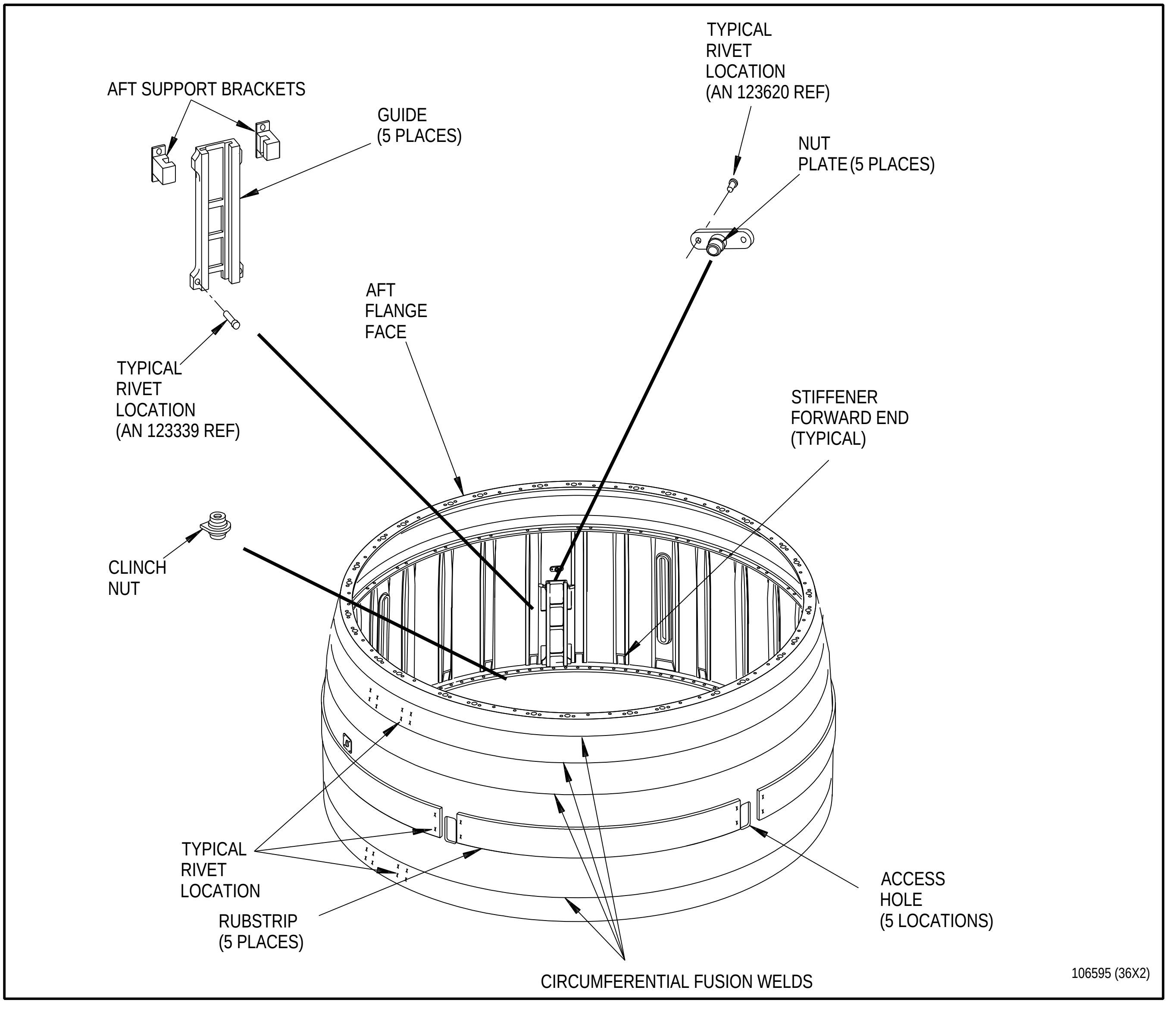


Figure 1. Augmentor Nozzle Support Assembly - Repair (Sheet 1 of 2)

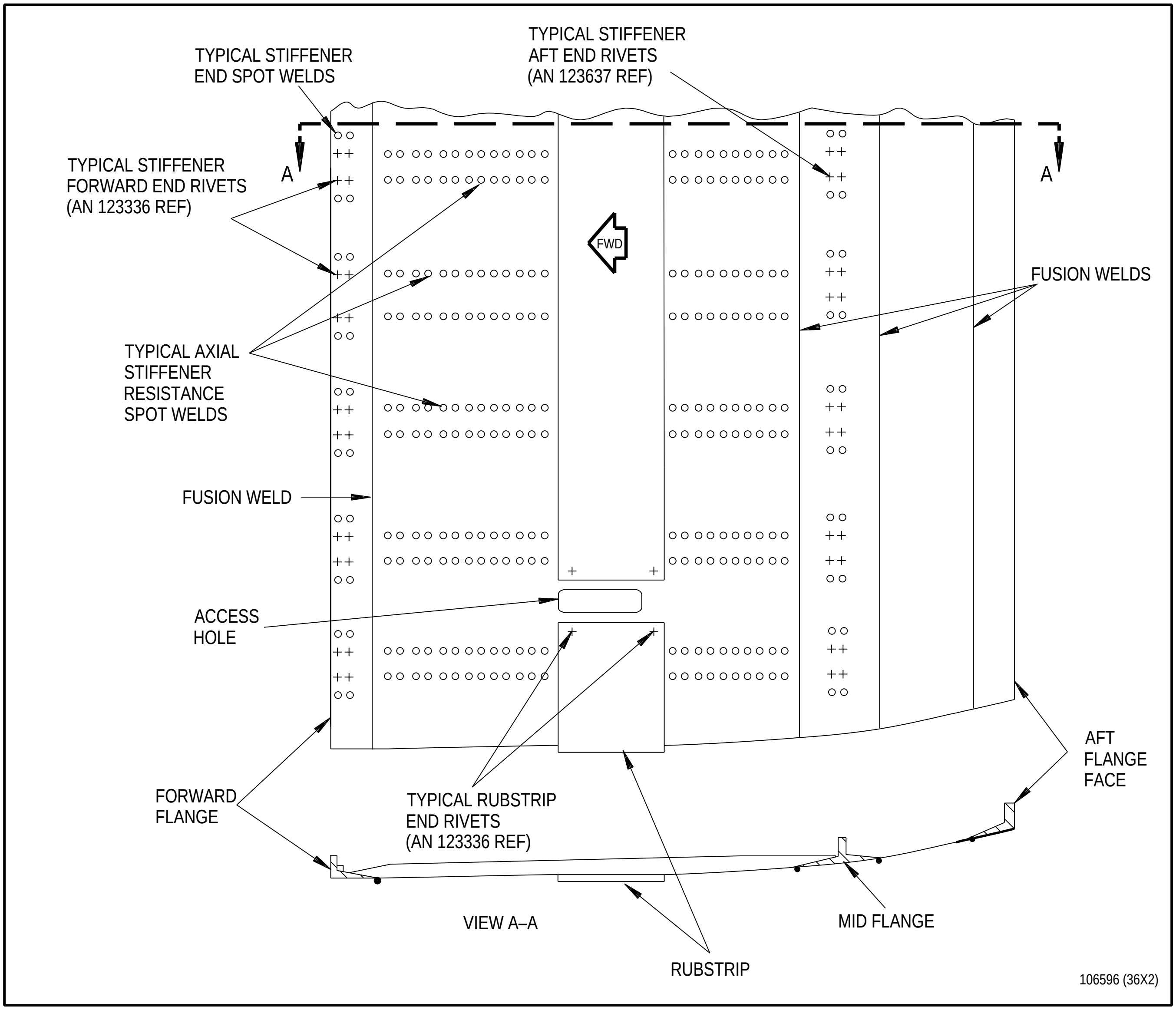


Figure 1. Augmentor Nozzle Support Assembly - Repair (Sheet 2 of 2)

4. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPAIR OF ONE-LINE CRACKS (INCLUDING THOSE INTO STIFFENER WELD BUT NOT INTO STIFFENER MATERIAL) AND TORN OR DEFORMED SKIN AREAS IN PANELS BETWEEN STIFFENERS.
(See Figures 2 through 5.)

a. Four methods are available for repair of one-line cracks and torn or deformed skin areas in panels between stiffeners.

(1) Method I is applicable only to one-line cracks in panel between forward flange and rubstrip.

(2) Method II is applicable only to one-line cracks, in panel between mid and aft flanges.

(3) Method III is applicable only to torn or deformed skin areas in panels between forward flange and rubstrip.

(4) Method IV is applicable only to one-line cracks in panel between mid flange and rubstrip.

b. The following panels are reparable:

(1) Plain panels, except:

(a) Panels containing an actuator access hole; or those circumferentially adjacent.

(b) Panels containing tracks.

(c) Panels containing, or having contained, drain ports if cracks extend into port wall.

(2) Panels with drain ports (Method I or III only) if damage does not extend into port wall. (Patch would be shortened from that shown in Method I with dimension(5) measured from port features.) (See figure 2.)

(3) Panels adjacent to cam follower stiffener.

c. Methods I, II, and IV are performed as follows:

(1) Remove stiffener rivets as required.

(2) Fluorescent penetrant inspect(FPI) to determine ends of cracks per SPOP 70. Refer to T.O. 2-1-111.

CAUTION

Stop drilling through a circumferential weld can cause severe damage to the augmentor nozzle support.

NOTE

High speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

(3) Stop drill ends of crack using 0.120 to 0.130 inch diameter drill.

(4) Deburr all holes.

(5) Fluorescent penetrant inspect(FPI) to ensure cracks have been properly stop drilled per SPOP 70. Refer to T.O. 2-1-111.

NOTE

Recommend repair patches for adjacent distress areas be combined into single patch. Maximum patch size should not exceed 200 square inches. Total area repaired for each support should not exceed 850 square inches.

(6) Lay out rivet pattern adjacent to crack on inside of support per figure 2, 3 or 5, as applicable.

(7) Fabricate patch plate per appropriate method. (See figure 2 or 3 using AMS 4911 titanium alloy.)

(8) Clamp patch plate in position and drill rivet holes per figure 2, 3 or 5. Refer to T.O. 2-1-111.

(9) Deburr all holes.

(10) Lightly hand polish patch plate and mating surface of support with hand held No. 240 silicon carbide abrasive paper.

(11) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

Priming may be omitted if using RTV 159 per specification PWA 617 or PWA 36003-1.

(12) Apply PWA 556 primer per paragraph 12, this work package. Refer to T.O. 2-1-111.

(13) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

(a) PWA 36047 (DC93-076) per paragraph 12, this work package.

(b) PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

(14) Clamp plate in position and rivet immediately after applying sealant. Refer to T.O. 2-1-111 except maximum gap (sheet separation) between rivets shall not exceed 0.050 inch. Rivet leading edge of patch first, starting from center of patch and working out toward edge of patch. Install remaining rivets as required.

(15) Verify that any stiffener rivets removed in step 1. are installed.

(16) Cure assembly at room temperature for 24 hours before handling.

d. Method III is performed as follows:

(1) Remove stiffener rivets as required.

(2) Fluorescent penetrant inspect(FPI) per SPOP 70 to determine the extent of damage. Refer to T.O. 2-1-111.

(3) Cut out minimum size which completely removes damaged area(1, figure 4) with minimum 0.500 inch radii.

(4) Fluorescent penetrant inspect(FPI) per SPOP 70. No cracks allowed. Refer to T.O. 2-1-111.

(5) Lay out rivet pattern adjacent to cutout on inside of support. Rivet locations as specified from edge of cutout shall be staggered between adjacent rows as shown. These rivets shall be 0.130 to 0.290 inch from stiffener flange edge and/or weld line. See figure 4.

(6) Establish patch size and outer rivet pattern per applicable Method I or II. Fabricate patch plate from AMS 4911 titanium alloy.

(7) Install patch plate per steps c.(8) through (16).

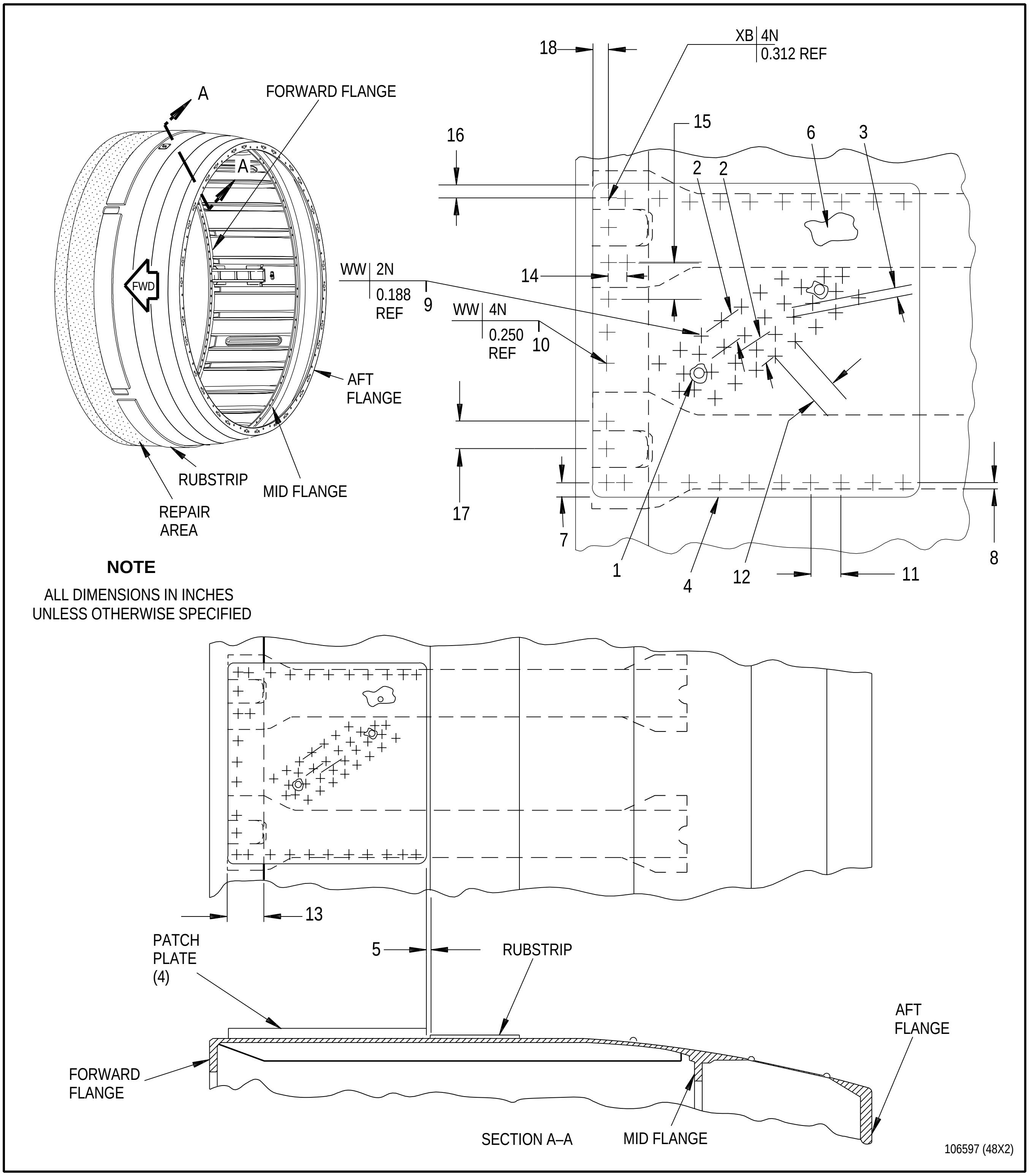


Figure 2. Augmentor Nozzle Support Assembly - Repair of One-Line Cracks in Panels Between Forward Flange and Rubstrip - Method I

Legend for figure 2

NOTE

- On panels with drain ports, patch would be shortened with dimension(5) measured from port features.
- No rivets shall be located within 0.280 inch of circumferential fusion welds.

1. Stop drill 0.120 to 0.130 inch diameter, 2 places per text.
2. 0.400 to 0.500 inch. Locate from nearest edge of crack.
3. 0.160 inch typical. Rivet locations from edge of crack or cutout shall be staggered between adjacent row, as shown.
4. Fabricate patch plate from AMS 4911 titanium alloy, 0.015 to 0.018 inch thick
5. 0.000 to 0.050 inch (See Note.)
6. Coat patch and mating surface with adhesive sealant per text.
7. 0.280 inch minimum, 3 sides
8. 0.140 inch
9. PN MS9319-004, rivet, as required, spacing rivets around crack as shown. These rivets shall be 0.130 to 0.290 inch from stiffener flange edge and/or weld line.
10. PN MS9319-098, rivet, as required, 3 sides of patch plate.
11. 0.500 to 0.600 inch, typical
12. 0.375 to 0.500 inch, typical
13. 0.950 to 1.050 inch
14. 0.400 inch, typical between existing stiffener rivet holes
15. 0.790 inch, minimum, typical
16. 0.270 inch, typical to existing stiffener rivet hole
17. 0.670 to 0.730 inch, typical
18. 0.280 inch, typical to existing stiffener rivet hole
19. PN AN123336, rivet, four per stiffener required through patch plate, stiffener, and flange. Locate manufactured head on near side.

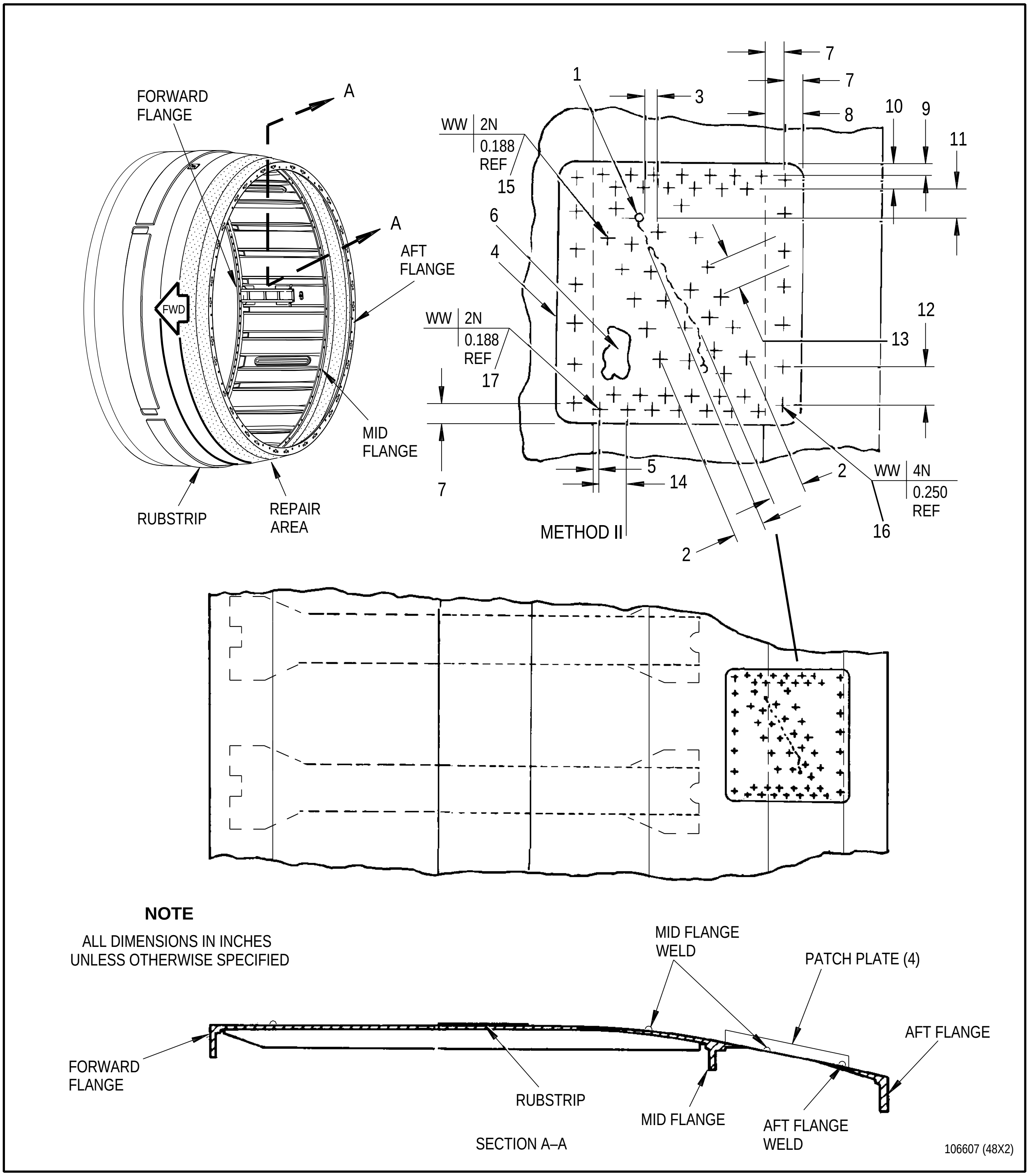


Figure 3. Augmentor Nozzle Support Assembly - Repair of One-line Cracks in Panels Between Mid and Aft Flanges - Method II

Legend for figure 3

NOTE

No rivets shall be located within 0.280 inch of circumferential fusion welds.

1. Stop drill 0.120 to 0.130 inch diameter, 2 places per text
2. 0.400 to 0.500 inch. Locate from nearest edge of crack.
3. 0.160 inch typical. Rivet locations from edge of crack or cutout shall be staggered between adjacent row as shown.
4. Fabricate patch plate from AMS 4911 titanium alloy, 0.016 to 0.023 inch thick.
5. 0.100 to 0.200 inch, both sides
6. Coat patch and mating surface with adhesive sealant per text.
7. 0.280 inch minimum, both sides
8. 0.560 to 0.760 inch, both sides
9. 0.200 inch, 2 places
10. 0.400 inch, 2 places
11. 0.400 to 0.500 inch, both sides
12. 0.500 to 0.600 inch typical both sides
13. 0.375 to 0.500 inch typical
14. 0.300 to 0.400 inch typical
15. PN MS9319-004, rivet, shall be spaced around crack as shown. These rivets shall be 0.130 to 0.290 inch from stiffener flange edge and/or weld line.
16. PN MS9319-098, rivet, as required, through flanges, both sides
17. PN MS9319-004, rivet, as required, between flanges, both sides

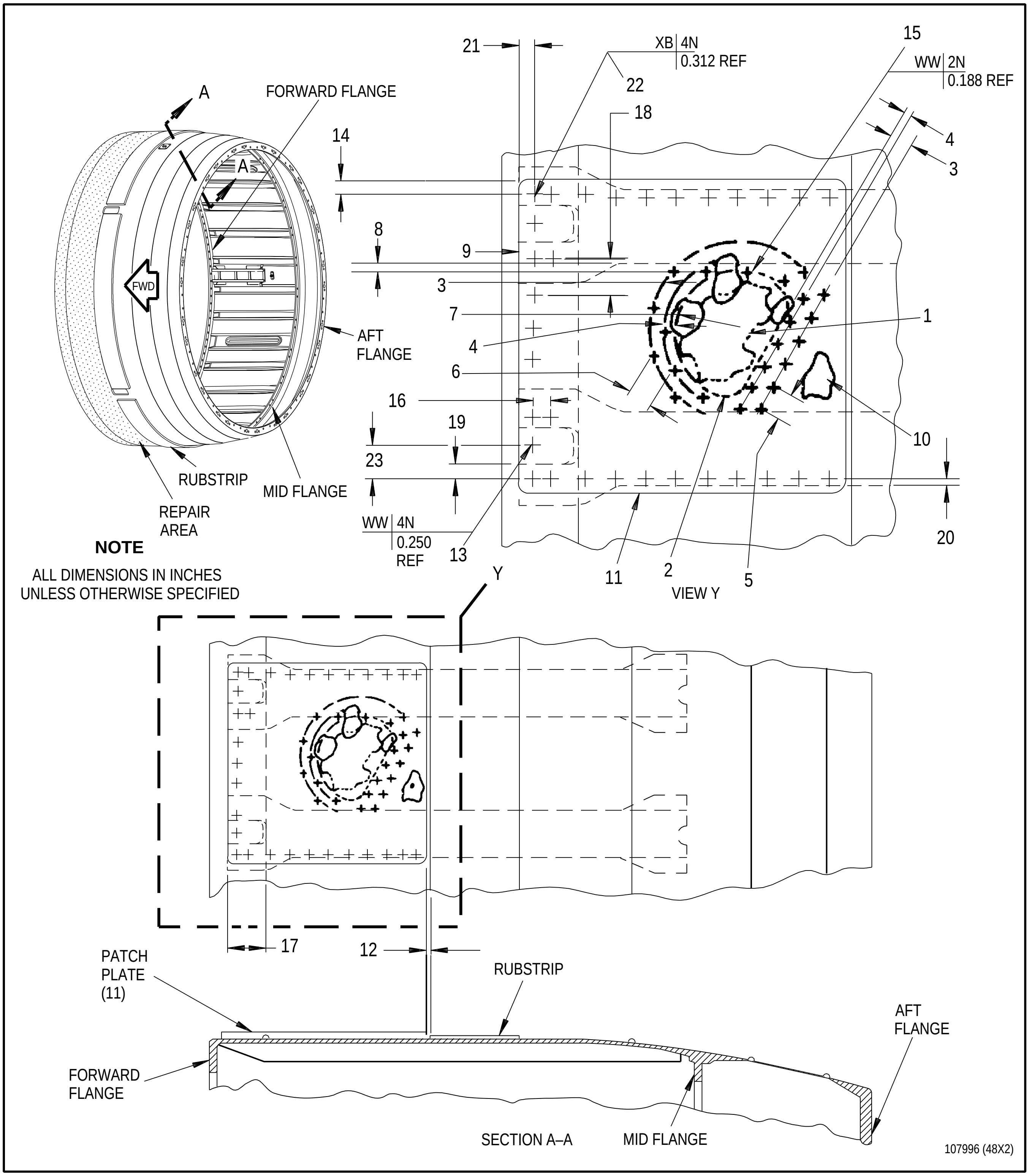


Figure 4. Augmentor Nozzle Support Assembly - Repair of Torn or Deformed Skin Areas in Panels Between Forward Flange and Rubstrip - Method III

Legend for figure 4

NOTE

- On panels with drain ports, patch would be shortened with dimension(12) measured from port features.
- No rivets shall be located within 0.280 inch of circumferential fusion welds.

1. Damage outline
2. Cutout damaged area as required per text.
3. 0.500 inch radius for rivet pattern
4. 0.160 inch
5. 0.375 to 0.500 inch
6. 0.500 to 0.600 inch
7. Modified radius
8. 0.320 inch minimum, all around, as required
9. Patch outline and outer rivet pattern
10. Coat patch and mating surface with adhesive sealant per text.
11. Fabricate patch plate from AMS 4911 titanium alloy, 0.016 to 0.023 inch thick.
12. 0.000 to 0.050 inch (See Note)
13. PN MS9319-098, rivet, as required, 3 sides of patch plate. Locate manufactured head on near side.
14. 0.280 inch minimum, three sides
15. PN MS9319-004, rivet, as required, through skin and patch plate. Rivets shall be spaced around cutout as shown and be 0.130 to 0.290 inch from stiffener flange edge and weld line. Locate manufactured head on near side.
16. 0.400 inch typical, between existing stiffener rivet holes
17. 0.950 to 1.050 inch
18. 0.790 inch, minimum, typical
19. 0.270 inch, typical to existing stiffener rivet hole
20. 0.140 inch
21. 0.280 inch, typical to existing stiffener rivet hole
22. PN AN123336, rivet, four per stiffener required through patch plate, stiffener, and flange. Locate manufactured head on near side.
23. 0.670 to 0.730 inch, typical

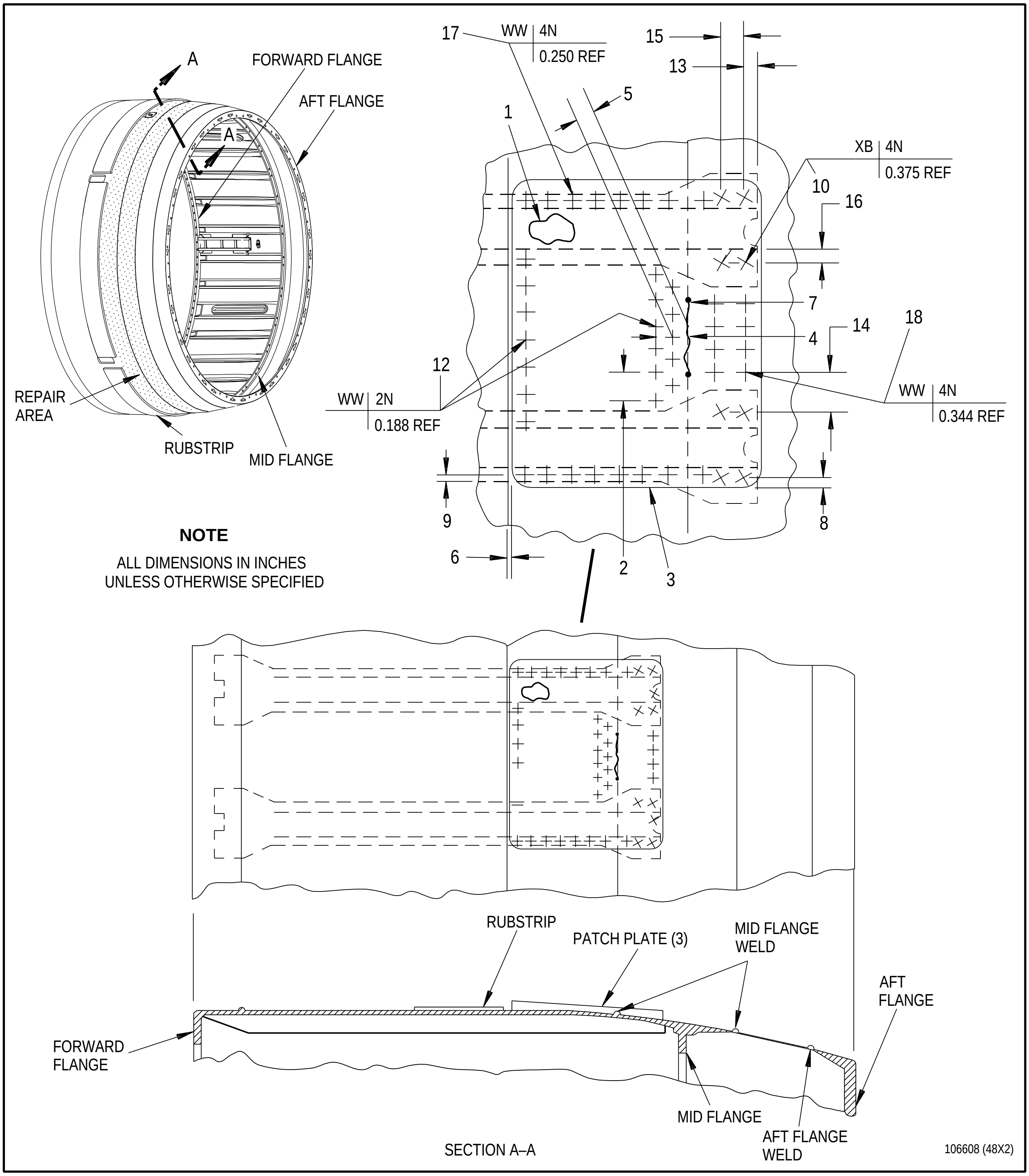


Figure 5. Augmentor Nozzle Support Assembly - Repair of <?Pub _newline>One-Line Cracks Between Mid Flange and Rubstrip - Method IV

Legend for figure 5

1. Coat patch and mating surface with adhesive sealant per text.
2. 0.375 to 0.500 inch typical
3. Fabricate patch plate from AMS 4911 titanium alloy, 0.015 to 0.018 inch thick.
4. 0.400 to 0.500 inch. Locate from nearest edge of crack.
5. 0.160 inch typical. Rivet locations from edge of crack or cutout shall be staggered between adjacent rows, as shown.
6. 0.000 to 0.050 inch
7. Stop drill 0.120 to 0.130 inch diameter, 2 places per text.
8. 0.280 inch minimum, four sides
9. 0.140 inch
10. PN AN123337, rivet, four per stiffener required through patch plate, stiffener, and flange. Locate manufactured head on near side.
11. 0.500 to 0.600 inch, typical
12. PN MS9319-004, rivet, as required, through skin and patch plate only. Rivets shall be spaced 0.130 to 0.290 inch from stiffener flange edge and/or weld line. Locate manufactured head on near side.
13. 0.280 inch, typical to existing stiffener rivet hole
14. 0.790 inch, minimum, typical
15. 0.500 inch, typical between existing stiffener rivet hole
16. 0.270 inch, typical to existing stiffener rivet hole
17. PN MS9319-098, rivet, as required, through patch plate, skin, and stiffener. Locate manufactured head on near side.
18. PN MS9319-101, rivet, as required, through patch plate and flange only. Locate manufactured head on near side.

5. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPAIR OF DAMAGE ACROSS SKIN-TO-FLANGE FUSION WELD.
(See Figures 6, 7, and 8.)

a. Three methods are available for the repair of damage across support assembly skin into the flange weld line.

(1) Method I applies to damage from aft skin into aft flange fusion weld.

(2) Method II applies to damage from skin between rubstrip and mid-flange into mid-flange fusion weld.

(3) Method III applies to damage from aft skin into mid-flange fusion weld.

b. Perform Methods I, II, or III as follows:

(1) Cut out damaged area as shown in figures 6, 7, or 8. Maximum penetration into flange shall not exceed 0.500 inch.

(2) Remove stiffener rivets as required.

(3) Fluorescent penetrant inspect(FPI) per SPOP 70 to ensure all damage has been removed. No cracks allowed. Refer to T.O. 2-1-111.

NOTE

Recommend repair patches for adjacent distress areas be combined into single patch. Maximum patch size should not exceed 200 square inches. Total area repaired for each support should not exceed 850 square inches.

(4) Lay out rivet pattern on inside of support per figure 6, 7, or 8.

(5) Fabricate patch plate per Methods I, II, or III (figures 6, 7, or 8) using appropriate material(9, figure 6), (11, figure 7), or (10, figure 8).

(6) Clamp patch plate in position and drill rivet holes per figure 6, 7, or 8 and T.O. 2-1-111.

(7) Deburr all holes.

(8) Prepare patch plate and mating surface of support as follows:

(a) Lightly hand polish patch plate and mating surface of support with No. 240 silicon carbide abrasive paper.

(b) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(c) Apply PWA 556 primer per paragraph 12.

(d) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

1 PWA 36047 (DC93-076) per paragraph 12.

2 PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

(9) Clamp patch plate in position and rivet immediately after applying sealant. Refer to T.O. 2-1-111. Maximum gap (sheet separation) shall not exceed 0.050 inch. Minimum edge distance waived.

(10) Verify that any stiffener rivets removed in step (2). are installed into original stiffener rivet holes.

(11) Cure assembly at room temperature for 24 hours.

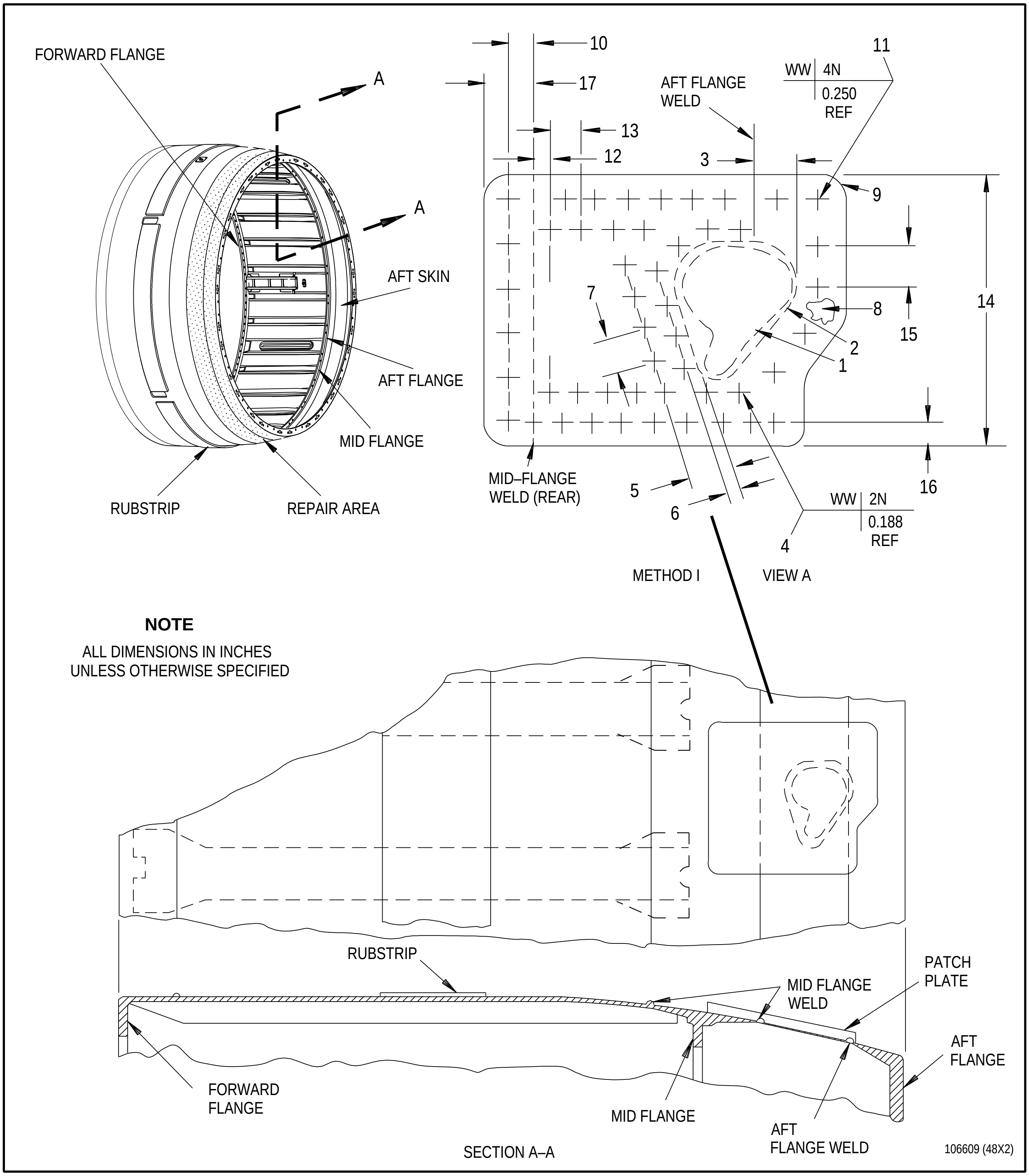


Figure 6. Augmentor Nozzle Support Assembly - Repair of Damage Across Aft Skin-to-Aft Flange Fusion Weld - Method I

Legend for figure 6

NOTE

No rivets shall be located within 0.280 inch of circumferential fusion welds.

1. Outline of typical damage. Shall not penetrate past aft flange fusion weld more than 0.500 inch maximum.
2. Completely cut out damaged area.
3. 0.500 inch maximum
4. PN MS9319-004, rivet, through skin and patch only between flanges as shown. Shall be 0.130 to 0.290 inch from stiffener flange and/or circumferential weld line.
5. 0.400 to 0.500 inch from nearest edge of damage
6. 0.160 inch, typical. Shall be staggered between adjacent rows.
7. 0.375 to 0.500 inch, typical
8. Coat patch and mating surface with adhesive sealant per text.
9. Fabricate patch plate from AMS 4911 titanium alloy, 0.027 to 0.031 inch thick.
10. 0.280 inch minimum, both sides
11. PN MS9319-098, rivet, through patch and flange as required.
12. 0.100 to 0.200 inch, both sides
13. 0.300 to 0.400 inch, typical
14. Typical patch shall be twice the width of damaged area.
15. 0.500 to 0.600 inch typical in flange area
16. 0.280 inch minimum, both sides
17. 0.560 to 0.760 inch

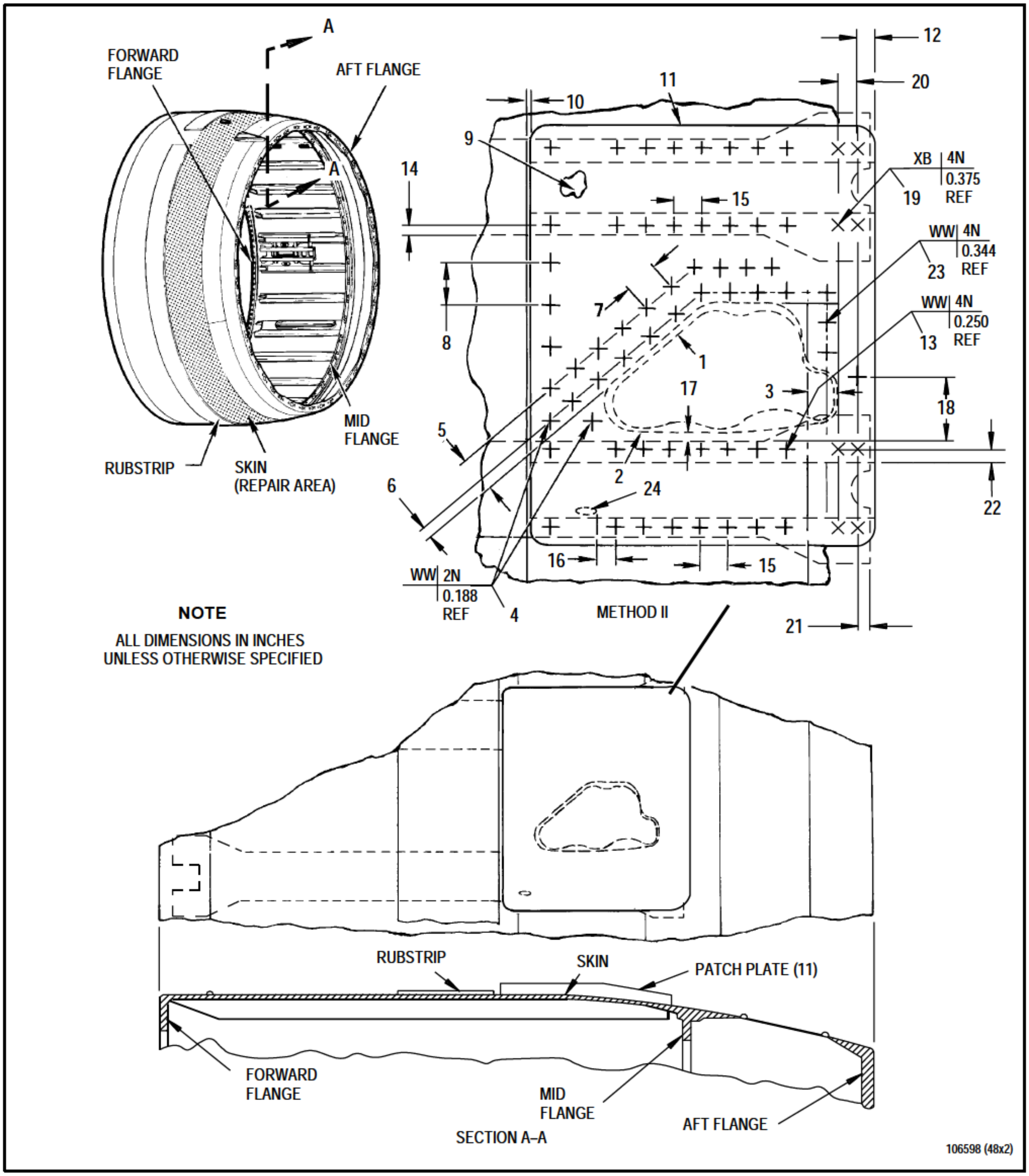


Figure 7. Augmentor Nozzle Support Assembly - Repair of Damage Across Forward Skin-to-Mid Flange Fusion Weld - Method II

Legend for figure 7

NOTE

No rivets shall be located within 0.280 inch of circumferential fusion welds.

1. Outline of typical damage. Shall not penetrate flange more than 0.500 inch maximum.
2. Completely cut out damaged area.
3. 0.500 inch maximum
4. PN MS9319-004, rivet, as required through skin and patch plate only. Shall be 0.130 to 0.290 inch from stiffener flange or weld line. Locate manufactured head on near side.
5. 0.400 to 0.500 inch from nearest edge of damage
6. 0.160 inch, typical. Shall be staggered between adjacent rows.
7. 0.375 to 0.500 inch, typical
8. 0.400 to 0.600 inch, typical
9. Coat patch and mating surface with adhesive sealant per text.
10. 0.050 inch maximum gap
11. Fabricate patch plate from AMS 4911 titanium alloy, 0.016 to 0.023 inch thick.
12. 0.280 inch minimum, four sides
13. PN MS9319-098, rivet, as required through stiffener, skin, and patch plate. Locate manufactured head on near side.
14. 0.140 inch
15. 0.350 to 0.450 inch, typical
16. 0.250 inch, minimum
17. 0.050 inch, minimum
18. 0.790 inch, minimum, typical
19. PN AN123337, rivet, four per stiffener required through stiffener, flange, and patch plate. Locate manufactured head on near side.
20. 0.500 inch, typical between existing stiffener rivet holes
21. 0.280 inch, typical to existing stiffener rivet hole
22. 0.270 inch, typical to existing stiffener rivet hole
23. PN MS9319-101, rivet, as required through flange and patch plate only. Locate manufactured head on near side.
24. Drain hole, reference

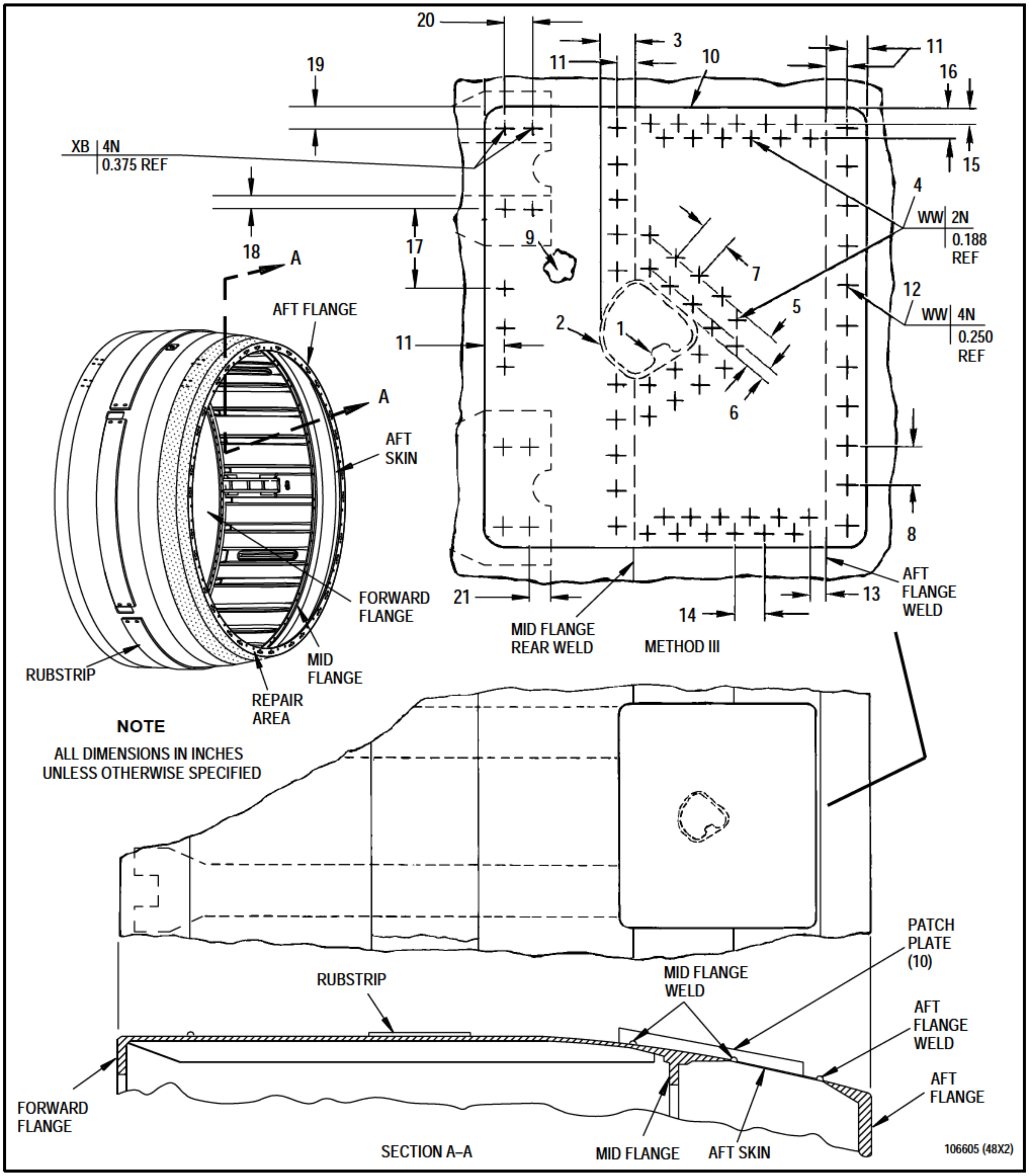


Figure 8. Augmentor Nozzle Support Assembly - Repair of Damage Across Aft Skin-to-Mid Flange Fusion Weld - Method III

Legend for figure 8

NOTE

No rivets shall be located within 0.280 inch of circumferential fusion welds.

1. Outline of typical damage. Shall not penetrate flange more than 0.500 inch maximum.
2. Completely cut out damaged area.
3. 0.500 inch maximum
4. PN MS9319-004, rivet, through skin and patch plate only. Rivet shall be 0.130 to 0.290 inch from stiffener flange or weld line. Locate manufactured head on near side.
5. 0.400 to 0.500 inch from nearest edge of damage
6. 0.160 inch, typical. Shall be staggered between adjacent rows
7. 0.375 to 0.500 inch, typical
8. 0.500 to 0.600 inch
9. Coat patch plate and mating surface with adhesive sealant per text.
10. Fabricate patch plate from AMS 4911 titanium alloy 0.027 to 0.036 inch thick.
11. 0.280 inch minimum
12. PN MS9319-098, rivet, as required through flange and patch plate only
13. 0.100 to 0.200 inch, both sides
14. 0.300 to 0.400 inch, typical
15. 0.200 inch, minimum, both sides
16. 0.400 inch, minimum both sides
17. 0.790 inch, minimum, typical
18. 0.270 inch, typical to existing stiffener rivet hole
19. 0.280 inch, minimum, typical
20. 0.500 inch, typical between existing stiffener rivet holes
21. 0.280 inch, typical to existing stiffener rivet hole
22. PN AN123337, rivet, four per stiffener required, through stiffener, flange, and patch plate. Locate manufactured head on near side.

6. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - SELF-LOCKING CLINCH NUT REPLACEMENT.
(See Figure 9.)

a. Remove unserviceable nut by drilling retaining flare with appropriate size drill.

b. Collapse or break away flare to remove nut.

c. Install new nut in flange hole.

d. Hold nut in anvil of PWA 56558 pusher. Tighten pusher against nut with handknob until nut is flared as shown in figure 9.

e. Deleted.

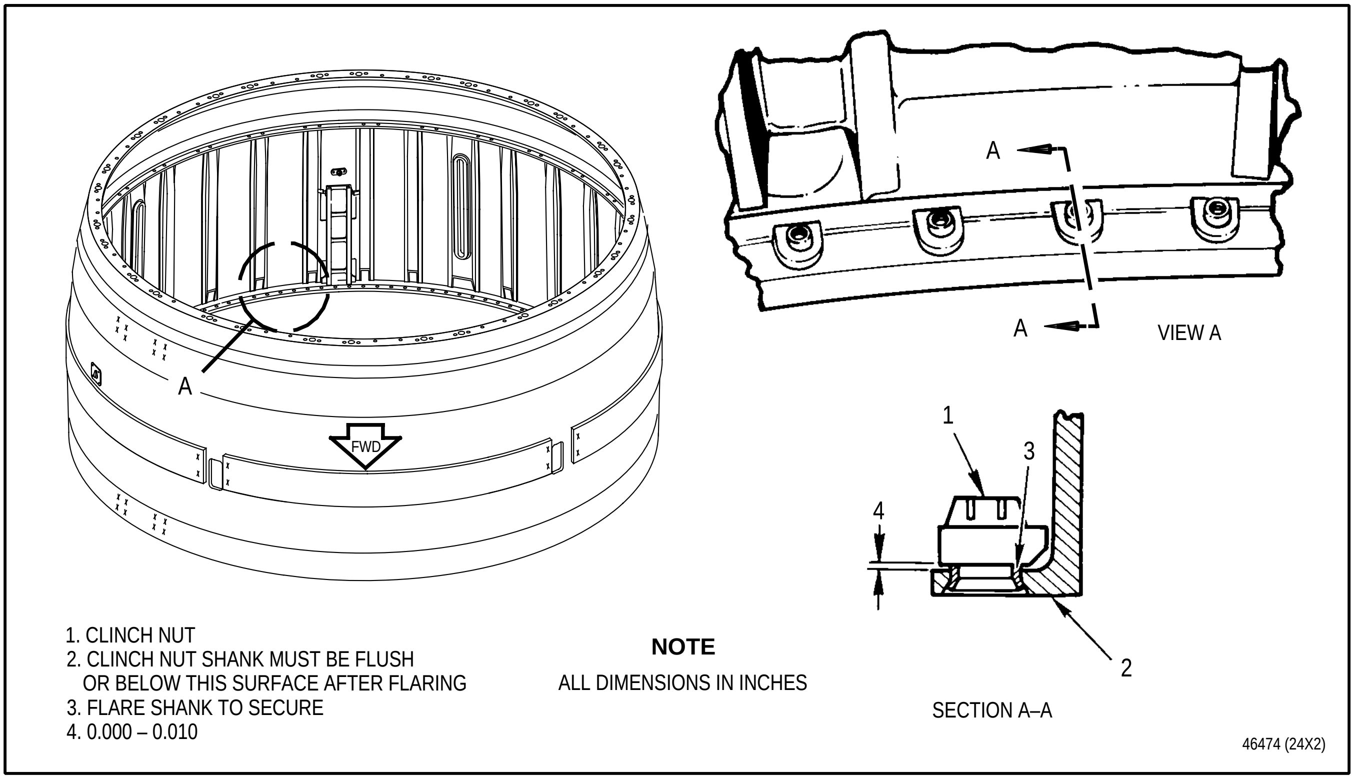


Figure 9. Augmentor Nozzle Support Clinch Nut Replacement

7. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - ANTIGALLING COMPOUND APPLICATION.

(See Figure 10.)

NOTE

Surface preparation is not required.

a. Clean areas to be coated using P-D-680, Type III, or isopropyl alcohol.

b. Apply PWA 36545 antigalling compound to areas shown per SPOP 748. Refer to T.O. 2-1-111. Baking is required. See figure 10.

c. Reference WP 603 00 for installation of runners.

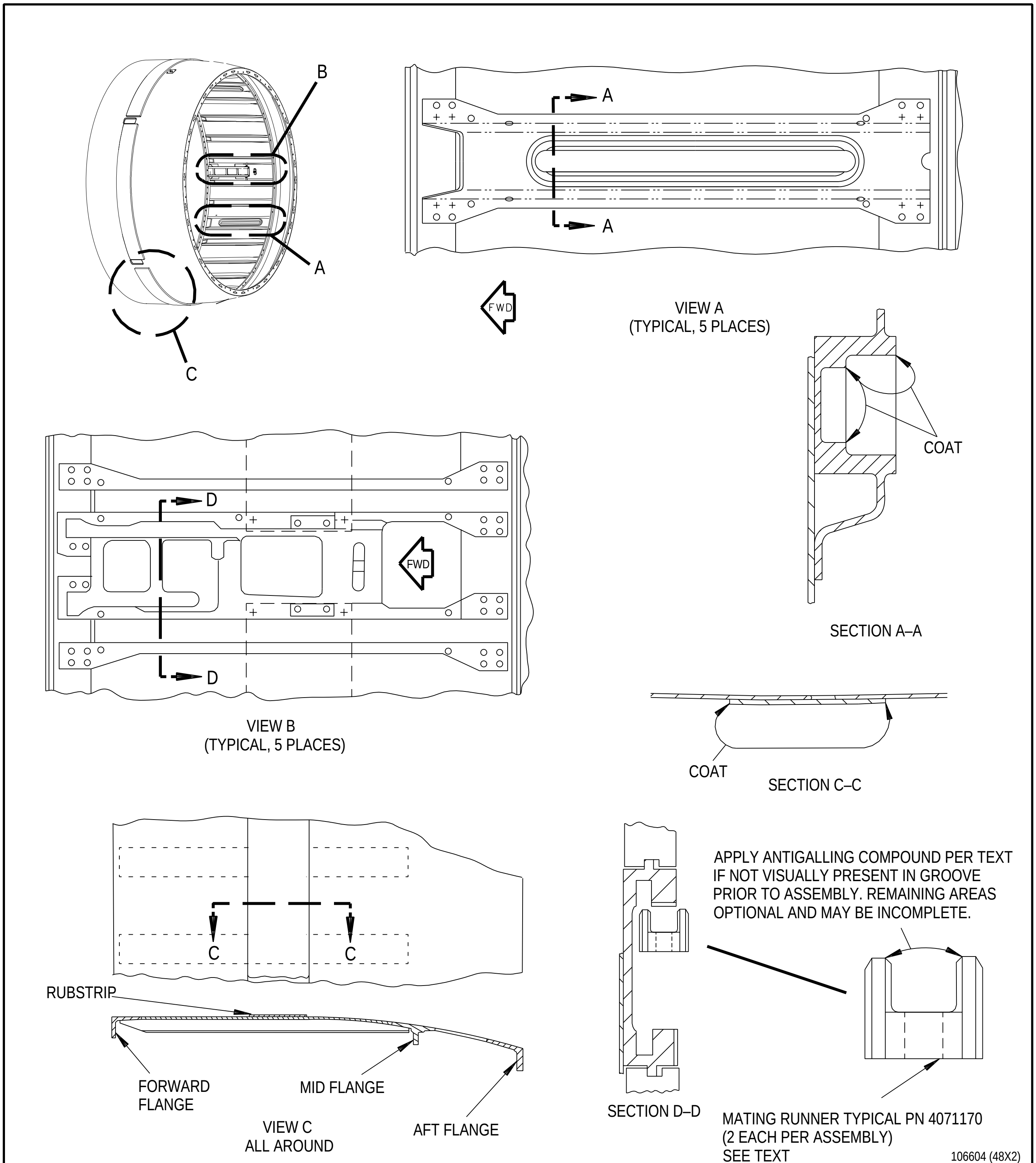


Figure 10. Augmentor Nozzle Support Assembly - Antigalling Compound Application

8. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - NUT PLATE REPLACEMENT.
(See figure 1.)

a. Remove rivets securing damaged nut plate. Refer to T.O. 2-1-111.

b. Install new nut plate and secure with rivets. Refer to T.O. 2-1-111.

9. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - RIVET REPLACEMENT.
(See figure 1.)

a. Replace rivets as necessary. Refer to T.O. 2-1-111.

10. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - BLEND REPAIR OF ROLLER TRACK WEAR AND SURFACE DAMAGE.
(See figure 11.)

a. Blend repair damaged area using fine stone/paper, blend surface. See figure 11 for requirements for blend repair procedures. Refer to T.O. 2-1-111.

b. Reapply antigallant to repaired area per procedure in paragraph 7.

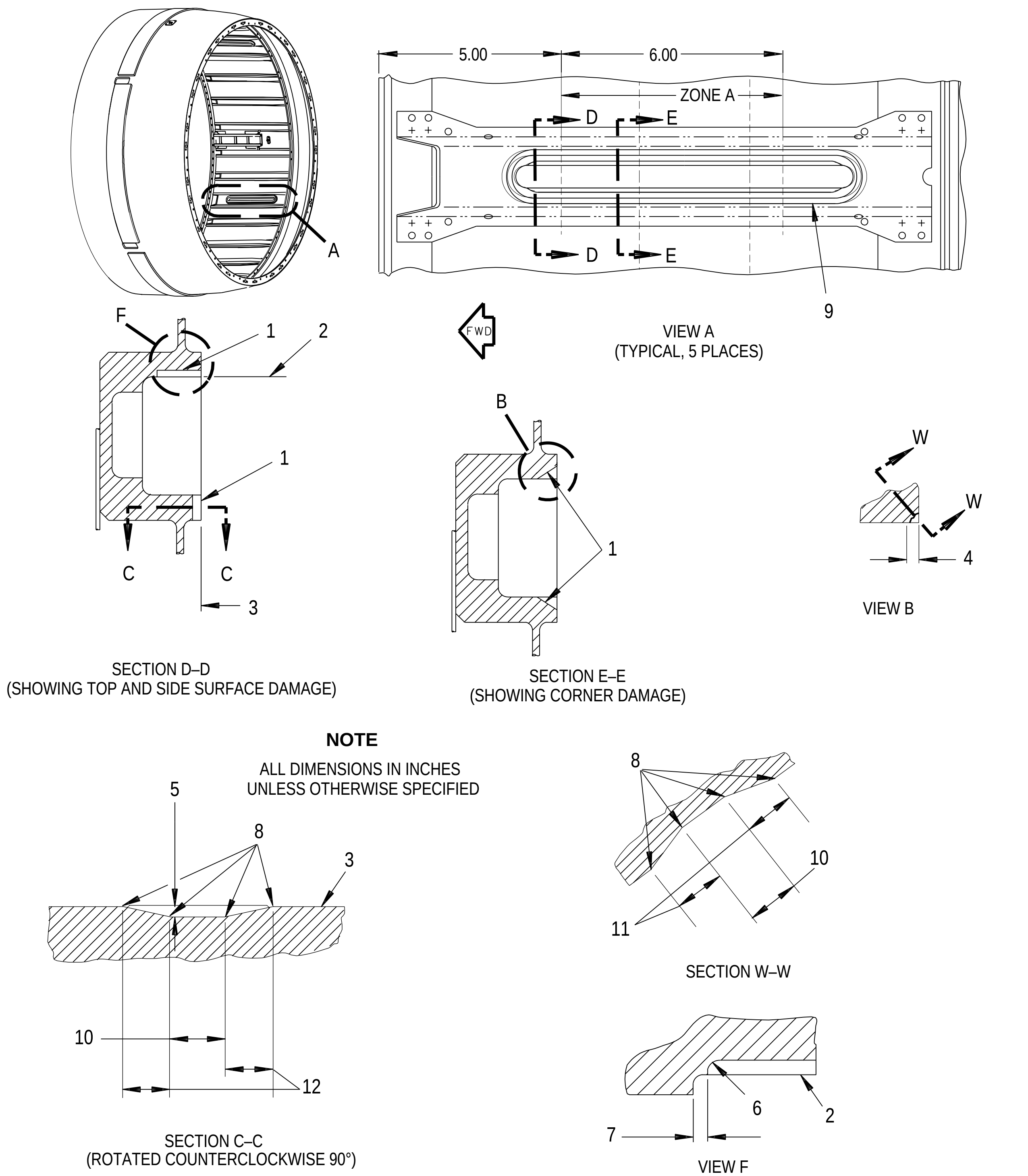


Figure 11. Augmentor Nozzle Support Assembly - Repair of Cam Follower Bearing Track Wear and Surface Damage

Legend for figure 11

1. Wear
2. Surface E, both sides
3. Surface G, both sides
4. Damage depth (dimension AY), = .100 zone A, .050 remainder
5. Damage depth (dimension AX), = .030 maximum
6. 0.031 to 0.062 inch modified radius
7. 0.000 to 0.0005 inch
8. Blend smoothly per text.
9. Worn or damaged cam follower bearing track
10. Maximum damage or wear distance.
11. Taper shall extend 3 to 6 times distance of dimension AY (4).
12. Taper shall extend 6 to 10 times distance of dimension AX(5).

11. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPLACEMENT OF DAMAGED RUBSTRIP SEGMENTS.
(See Figure 12.)

NOTE

This procedure provides instruction for the removal and replacement of augmentor nozzle support rubstrip segments.

a. Grind off the four rivet heads located on the damaged rubstrip segment. Push remainder through hole. Repeat as required to prepare additional damaged rubstrips for removal. Each of the five rubstrip segments have two rivets at each end.

b. Using a nonmetallic pry bar, lift one end of rub strip to disbond silicon sealant. Peel strip from nozzle support assembly.

c. Remove remaining silicone rubber from area under rubstrip. Use only non metallic scraper or nylon brush. Do not attempt to grit blast to remove remaining rubber.

c1. Match mark rubstrip to nozzle support to ensure installation in the same position as transfer drilled.

d. Locate new rubstrip on nozzle support assembly and temporarily secure in place. (See figure 12, Section A-A, view in direction C) Do not apply RTV adhesive prior to this step.

NOTE

Do not enlarge existing holes in augmentor nozzle support.

e. Transfer drill four(4) holes from the nozzle support assembly to the new rubstrip. (See figure 12.) Remove Rubstrip.

f. Locally fluorescent penetrant inspect(FPI) rivet holes in nozzle support and rubstrip. Refer to T.O. 2-1-111 (SPOP 70B). No cracks permitted.

g. Clean rubstrip inner diameter and mount area on nozzle support structure. Refer to T.O. 2-1-111, PWA 83-B2.

h. Apply silicone sealant per PWA 615 using PWA 36003-1 material. See view B, D and view in direction C in figure 12. Refer to T.O. 2-1-111 for application and cure instructions.

i. Mount new rubstrip segments on support assembly as match marked. Rivet four(4) places. Refer to T.O. 2-1-111. Assembled parts must meet dimensional requirements. See figure 12.

j. Repeat step c1. through h. as required to install remaining rubstrips.

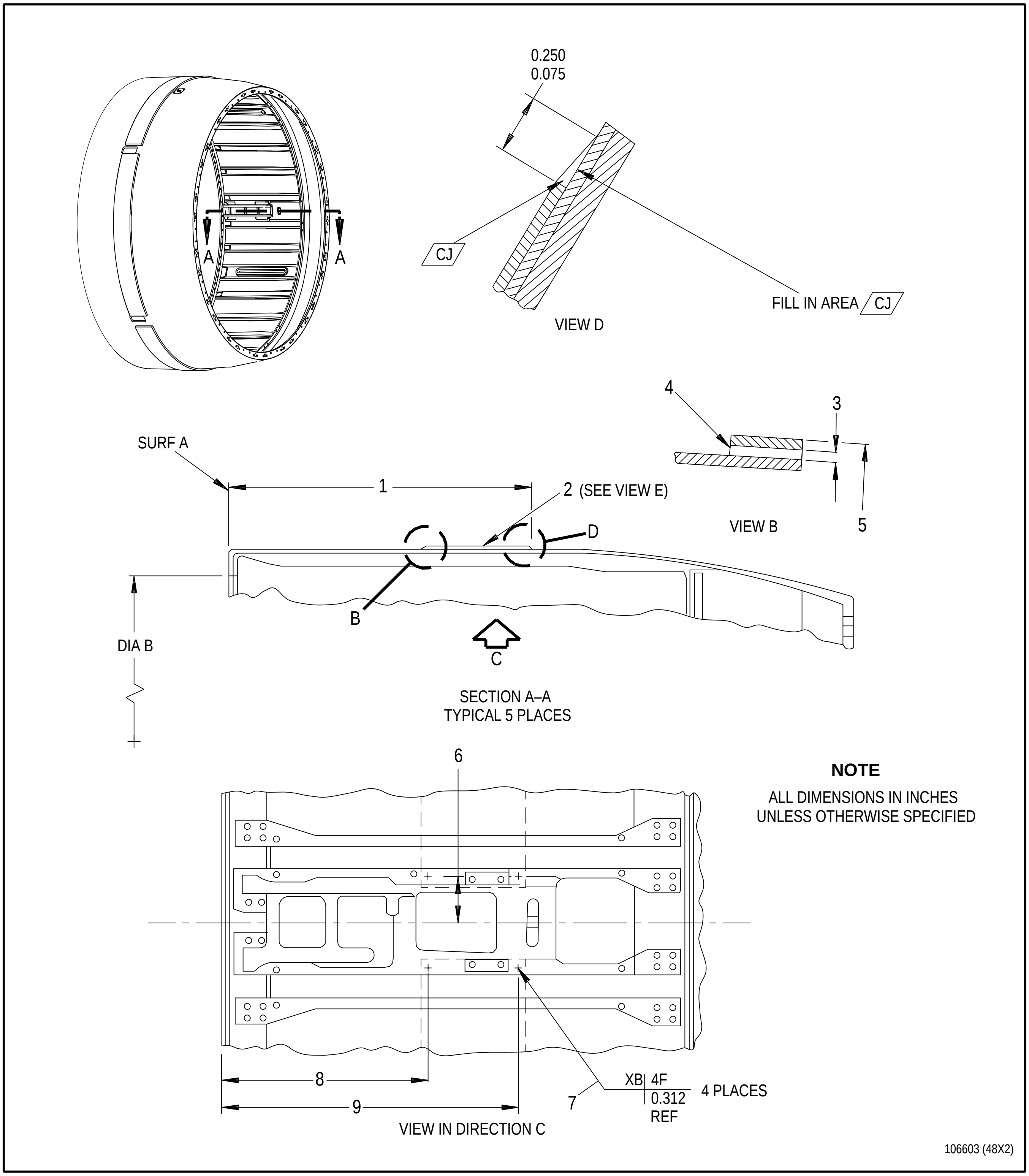


Figure 12. Augmentor Nozzle Support Assembly - Replacement of Damaged Rubstrip Segments (Sheet 1 of 2)

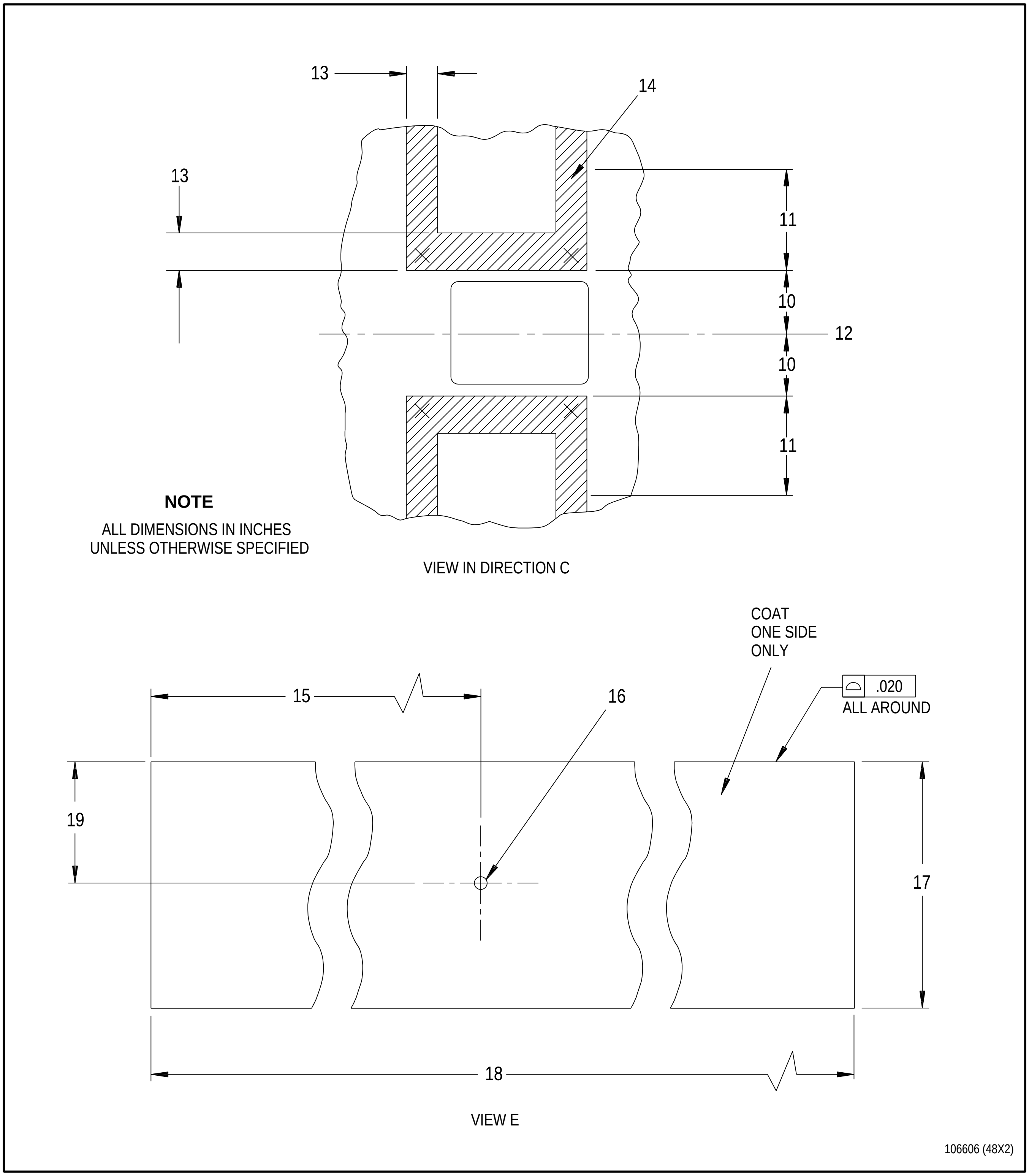


Figure 12. Augmentor Nozzle Support Assembly - Replacement of Damaged Rubstrip Segments (Sheet 2 of 2)

Legend for figure 12

1. 9.910 to 9.950 inch over distance(11) only. Remainder must lie within 9.810 to 10.050 inch.
2. PN 4071162 rubstrip or locally fabricated from AMS 4911 titanium alloy (0.016 to 0.023 inch thick) using dimensions shown in View E. Reapply antigallant to the fabricated segment per paragraph 7.
3. 0.130 inch maximum
4. PWA 36003 silicon rubber
5. 46.590 inch maximum average diameter, over rubstrip
6. 1.630 inch minimum typical four places - reference only
7. PN AN123336 rivet, four per rubstrip segment required through stiffener, skin, and rubstrip. Locate manufactured head on far side.
8. 6.720 inch typical 2 places - reference only
9. 9.680 inch typical 2 places - reference only
10. 1.195 to 1.245 inch. 1.245 inch maximum may be locally exceeded provided the sum of all dimension(10) does not exceed 12.450 inches.
11. 2.000 inch
12. Part(2) may be locally trimmed at assembly, to maintain dimension(10).
13. 0.500 to 1.500 inch typical, both sides
14. Silicon rubber coat area
15. 13.285 to 13.485 inches
16. 0.170 to 0.210 inch diameter
17. 3.460 inches
18. 26.770 inches
19. 1.630 to 1.830 inches

12. PRIMER (PWA 556) AND SEALANT (PWA 36047) USE.

WARNING

Provide adequate ventilation when using PWA 556 primer. Prolonged breathing of fumes may cause drowsiness. Wear eye protection when handling this material.

a. Clean mating surface of nozzle support and patch plate per PWA 83-B2. Refer to T.O. 2-1-111.

b. Within 30 minutes of cleaning per PWA 83-B2, prime mating surface of support and patch plate with PWA 556 primer. Allow to dry for 30 minutes minimum at room temperature. If application of sealant PWA 36047 cannot be practically accomplished within two hours after primer has dried, protect primed area by placing a piece of clean plastic around primed area. Tape plastic around outside diameter of primed area. Also, place patch plate in clean plastic bag for protection.

c. Apply sealant within 24 hours after application of primer as follows to ensure adequate adhesion:

(1) If application of sealant cannot be accomplished within specified time period, parts are to be blasted to remove primer per SPOP 8 or 9. Refer to T.O. 2-1-111.

(2) Prepare PWA 36047 sealant per instructions on label. De-airing of sealant in a vacuum and mixing in an air-free mixer is waived. Controlled environment requirements in accordance with specification PWA 104 are waived

(3) Within two hours of removing plastic from parts or drying of primer and within 20 minutes of completing mixing of PWA 36047 sealant, apply uniform coat of sealant to mating surface of support and patch plate. Apply sufficient sealant to assure complete coverage as indicated by slight excess of material around edges and holes. There is no sealant thickness requirement.

NOTE

Rivets installed as follows must be installed before sealant has hardened to point where it will not form a seal.

d. Within one hour of mounting repair part on nozzle support assembly do the following:

(1) Install 50 percent or more of rivets through repair part and nozzle support assembly evenly distributed around all areas per PWA 357-21. Refer to T.O. 2-1-111.

e. Wipe clean any excess sealant or residual adhesive on nozzle support assembly per PWA 83-B2. Refer to T.O. 2-1-111.

f. Cure assembly at room temperature for 24 hours before handling.

13. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPLACEMENT OF GUIDES.
(See Figure 13.)

a. If necessary, remove nut plate(9) per paragraph 8, this work package.

b. Remove rivets at location(1), 2 places, and damaged guide support(2). Refer to T.O. 2-1-111.

c. Clamp new guides in position and drill holes at location(1), 2 places. Refer to T.O. 2-1-111.

d. Deburr all holes.

e. Install new rivets at location(1), 2 places. Refer to T.O. 2-1-111.

f. Reinstall nut plate, if removed in step a. per paragraph 8, this work package.

Legend for figure 13

1. PN AN123339 rivet, two required
2. PN 4080512, guide
3. 0.640 to 0.660 inch from Surface A
4. 0.305 inch, 2 places, reference
5. 0.180 inch, 2 places, reference
6. 1.875 inches clearance envelope relative to Surface A and Datum C(7)
7. 0.3135 inch diameter at maximum material condition hole in rear flange, Datum C, reference
8. Vertical centerline (reference). Drain boss may be used as locating feature.
9. PN 4027891, nut plate, reference

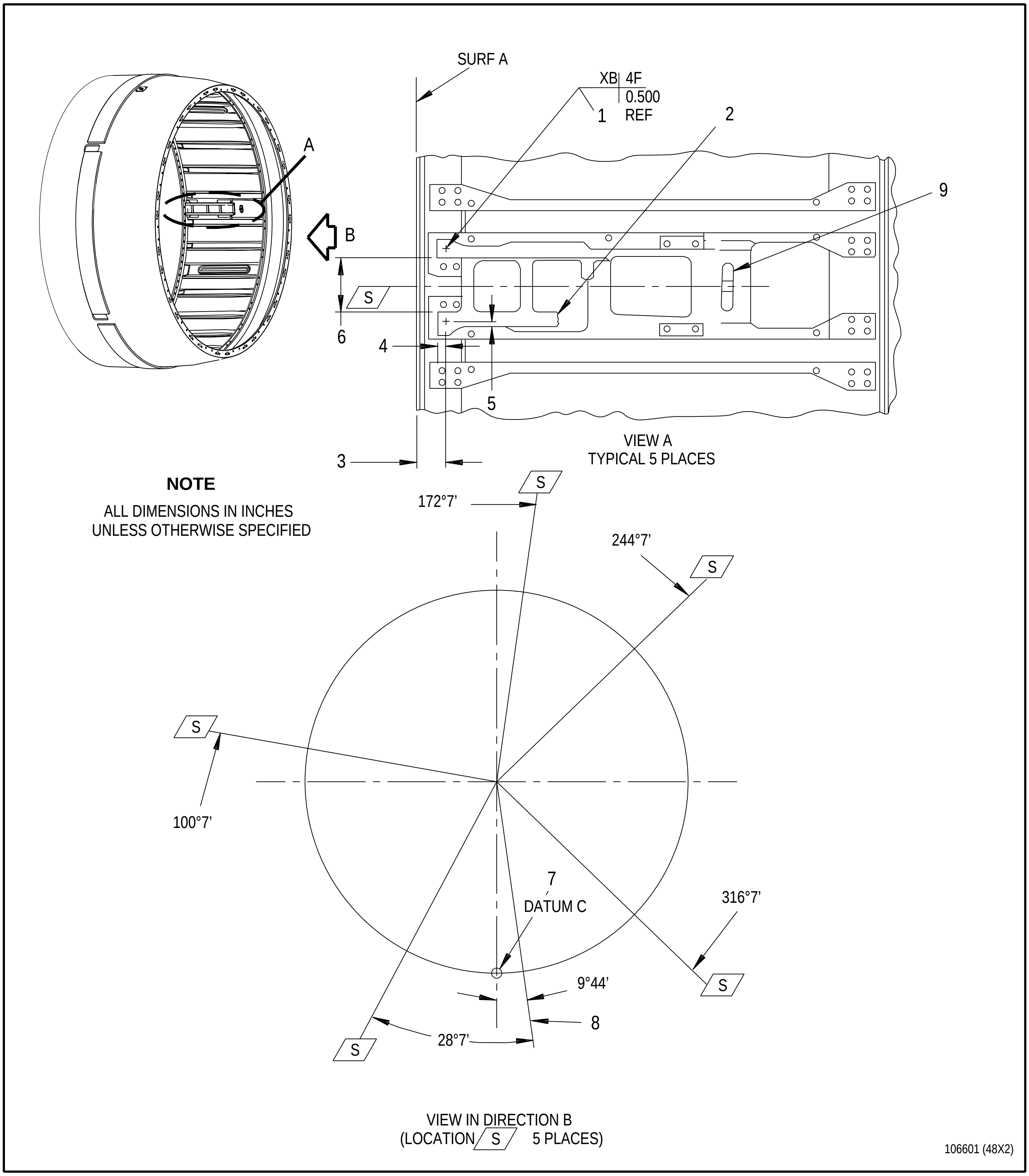


Figure 13. Augmentor Nozzle Support Assembly - Replacement of Guides

14. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPLACEMENT OF GUIDE AFT SUPPORT BRACKET.
(See Figure 14.)

a. Remove rivets at location(1), 2 places per bracket and damaged aft support brackets(2). Refer to T.O. 2-1-111.

b. Clamp new guides(2) in position and drill holes at location(1), 2 places per bracket. Refer to T.O. 2-1-111.

c. Deburr all holes.

d. Install new rivets at location(1), 2 places per bracket. Refer to T.O. 2-1-111.

Legend for figure 14

1. PN 123620, rivet, two required
2. PN 4080514, aft support bracket
3. 0.200 inch typical, 2 places per bracket, reference
4. 0.200 inch typical, 2 places per bracket, reference
5. 7.980 to 8.000 inches, 2 places, reference
6. 2.540 to 2.550 inches
7. 0.3135 inch diameter at maximum material condition hole in rear flange, Datum C, reference
8. Vertical centerline (reference). Drain boss may be used as locating feature.

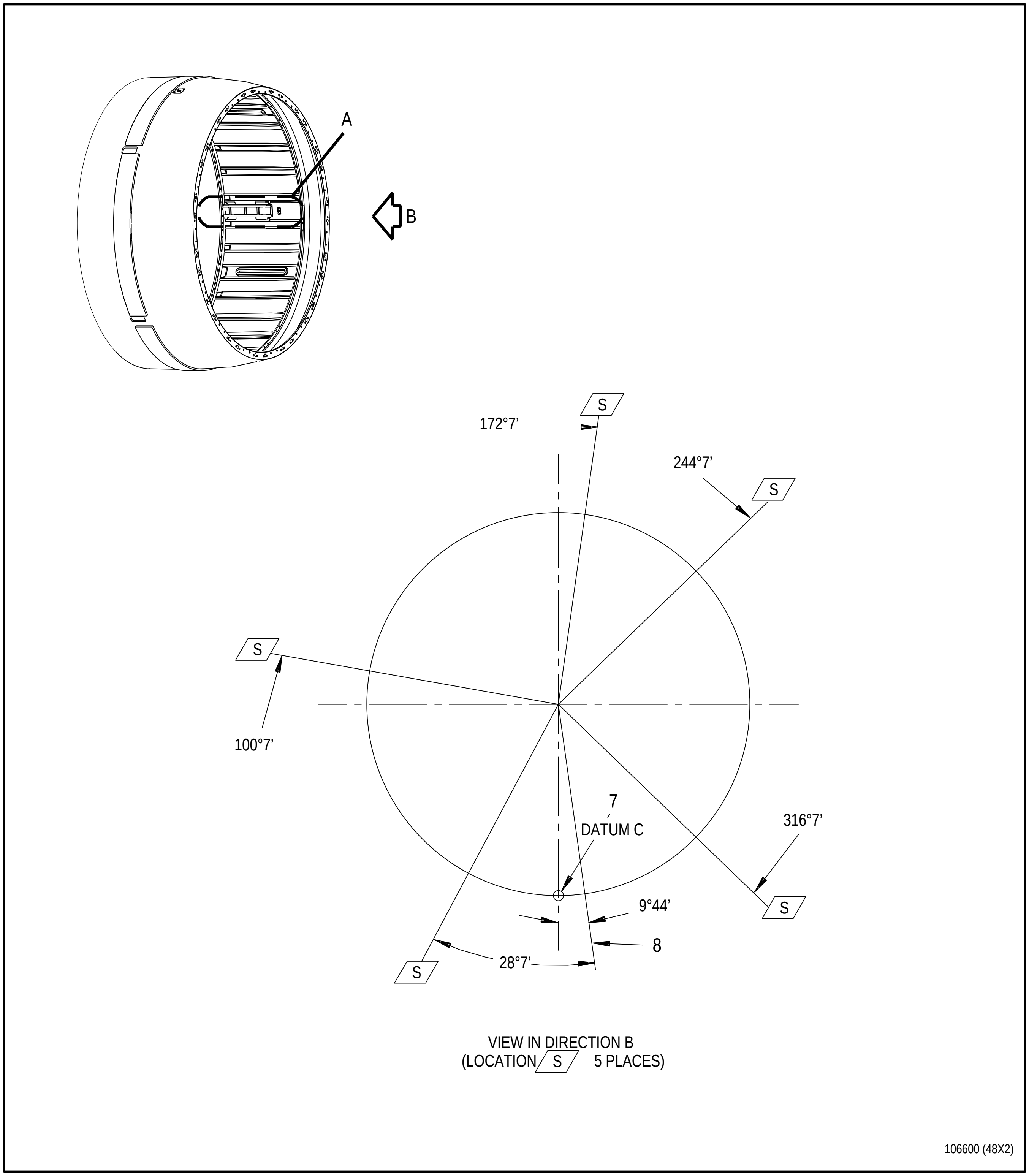


Figure 14. Augmentor Nozzle Support Assembly - Replacement of Guide Aft Support Bracket (Sheet 1 of 2)

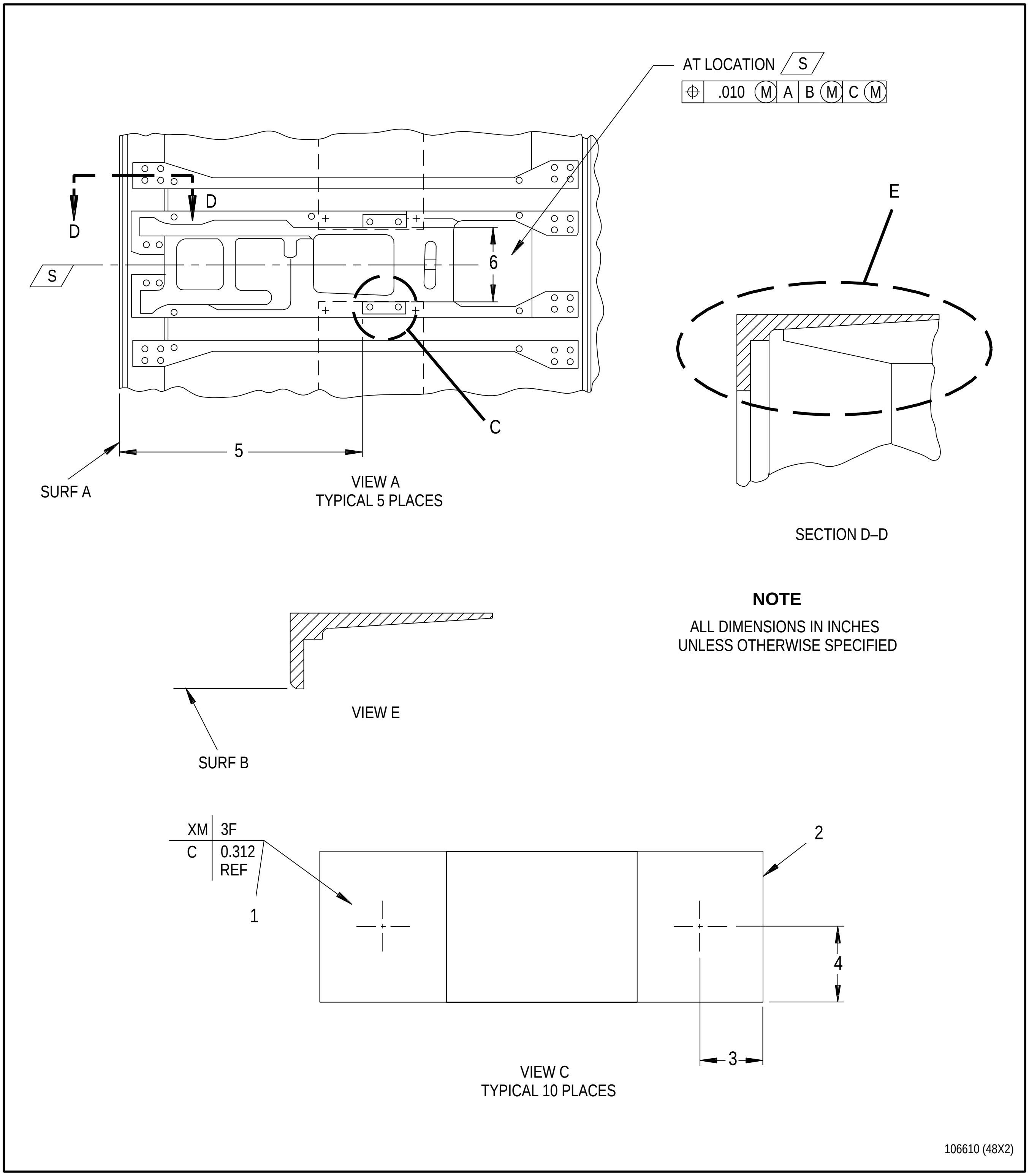


Figure 14. Augmentor Nozzle Support Assembly - Replacement of Guide Aft Support Bracket (Sheet 2 of 2)

15. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - APPLICATION OF PAINTED MARKINGS.
(See Figure 15.)

a. Mask augmentor nozzle support assembly outside regions specified in figure per SPOP 36 to ensure all existing marking is exposed to grit blasting. Refer to T.O. 2-1-111.

CAUTION

Dwelling more than specified time on any one area may cause damage to support skin.

b. Prepare surface for painting by grit blasting per SPOP 170 using number 90 aluminum oxide grit or equivalent. Refer to T.O. 2-1-111. Do not vapor degrease. Use maximum line pressure of 30 psi. Do not dwell more than 5 seconds on any one area. As an alternative to grit blasting, area may be hand sanded using coarse (80-100 grit) silicon carbide paper.

c. Clean grit blasted area using TT-I-735 isopropyl alcohol or P-D-780, Type III.

d. Apply NO PUSH or NO STEP lettering using SermeTel 406 high temperature color finish per requirements of views A, B, or C, as applicable. Characters to be 1.00 inch high standard stencil lettering. If any of previous markings are still visible after grit blasting, align stencil with existing characters.

e. Air cure at 150° to 200°F (66° to 93°C) for 1.5 hours followed by 275° to 325°F (135° to 163°C) for 1 hour.

f. Remove masking.

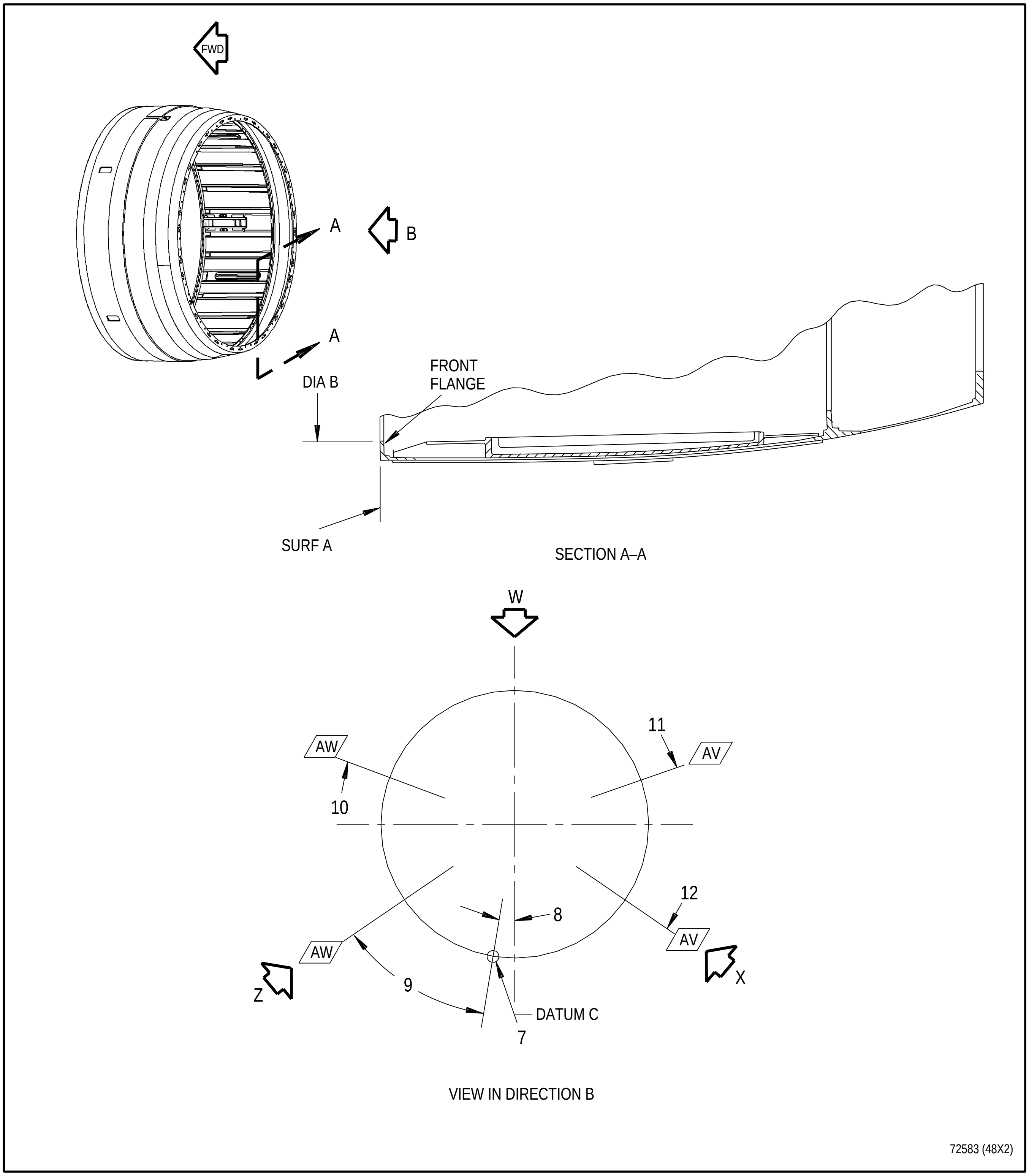


Figure 15. Augmentor Nozzle Support Assembly - Application of Painted Markings (Sheet 1 of 2)

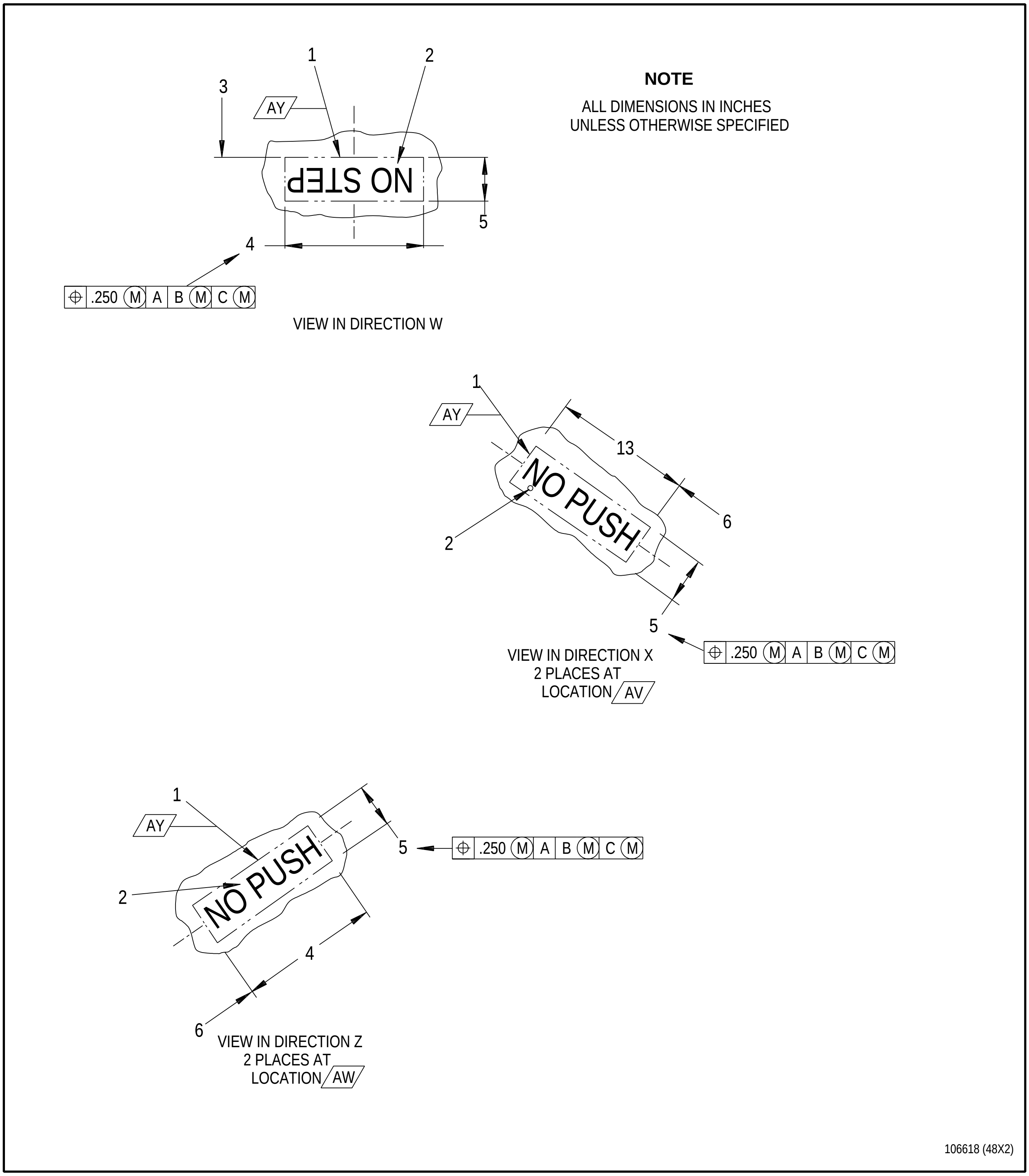


Figure 15. Augmentor Nozzle Support Assembly - Application of Painted Markings (Sheet 2 of 2)

Legend for figure 15

1. Region AY
2. Mark using 1.000 inch high standard size lettering per text.
3. 16.375 to 16.625 inches to Surface A
4. 5.750 to 6.100 inches
5. 1.750 to 2.100 inches
6. 12.875 to 13.125 inches to Surface A
7. 0.3135 inch diameter at maximum material condition hole in rear flange, Datum C(reference)
8. 9°44′
9. 45°16′
10. 95°16′
11. 241°9′
12. 295°16′

16. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPAIR OF STIFFENER FORWARD END CRACKS AT LOCATION A AND B.
(See Figure 16.)

CAUTION

This repair is not intended for cracks outside Zone X(19, Figure 16). Using this repair for cracks outside Zone X(19) can severely damage part.

a. Remove existing stiffener rivets at forward end. Refer to T.O. 2-1-111.

b. Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

CAUTION

Stop drilling through a circumferential weld can cause severe damage to augmentor nozzle support.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for this procedure.

c. Stop drill ends of crack using 0.120 to 0.130 inch diameter drill. Do not stop drill in circumferential fusion welds.

d. Deburr all holes.

e. Fluorescent penetrant inspect(FPI) per SPOP 70 to make sure cracks have been properly stop drilled. Refer to T.O. 2-1-111.

NOTE

It is recommended that repair patches for adjacent distress areas be combined into single patch.

f. Determine patch size to not exceed 200 square inches OD. Total area repaired for each support shall not exceed 850 square inches OD.

CAUTION

Failure to install shims will result in hardware damage during rivet installation.

NOTE

AMS 4916 or AMS 4901 (commercially-pure titanium) may be used as alternate material for shims.

g. Select proper thickness of shims(12) to fill gap. Position shims as shown.

h. Fit doubler(13) over existing stiffener as shown and measure gap(15).

i. Select proper thickness of shim(17) to fill gap. Install shim while maintaining dimension(16). Remaining clearance of gap(15) shall not exceed 0.010 inch after shim(17) is installed.

j. Clamp doubler(13) and shim(17) to existing stiffener.

NOTE

PN NAS9307M is preferred rivet.

k. Measure thickness of assembly to be riveted(21). If thickness is equal to or less than 0.125, use rivets with a -02 length suffix on their part number. If this value is greater than 0.125, use rivets with a -03 length suffix on their part number.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for this procedure.

l. Drill six 0.128 to 0.132 inch diameter rivet holes through top of stiffener.

m. Deburr all holes.

n. Install rivets(7). Refer to T.O. 2-1-111.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for this procedure.

o. Drill 0.128 to 0.132 inch diameter rivet holes through doubler, shims, stiffener, and support. For rivets(8), line drill the holes through the existing stiffener rivet holes. Refer to T.O. 2-1-111, except minimum edge distance is waived unless otherwise specified.

p. Position plate(14) on exterior of nozzle support and line drill 0.128 to 0.132 inch diameter rivet holes through plate. Line drill through holes created in previous step. Refer to T.O. 2-1-111, except minimum edge distance is waived unless otherwise specified.

q. Deburr all holes.

r. Prepare patch plate and mating surface of support as follows:

(1) Lightly hand polish contacting surfaces of patch plate and mating surface of support with No. 240 silicon carbide abrasive paper.

(2) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(3) Apply PWA 556 primer per paragraph 12. Refer to T.O. 2-1-111.

(4) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

(a) PWA 36047 (DC93-076) paragraph 12.

(b) PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

(5) Clamp plate in position and install remaining rivets (6) and (8), immediately after applying adhesive. Maximum gap (sheet separation) between rivets shall not exceed 0.050 inch. Refer to T.O. 2-1-111.

(6) Clean excess sealant using PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

PWA 617 or PWA 36003-1 adhesives require moisture to cure completely. Optimum curing conditions are 50% relative humidity at 75°F or equivalent moisture level.

(7) Cure assembly at room temperature for 24 hours before handling.

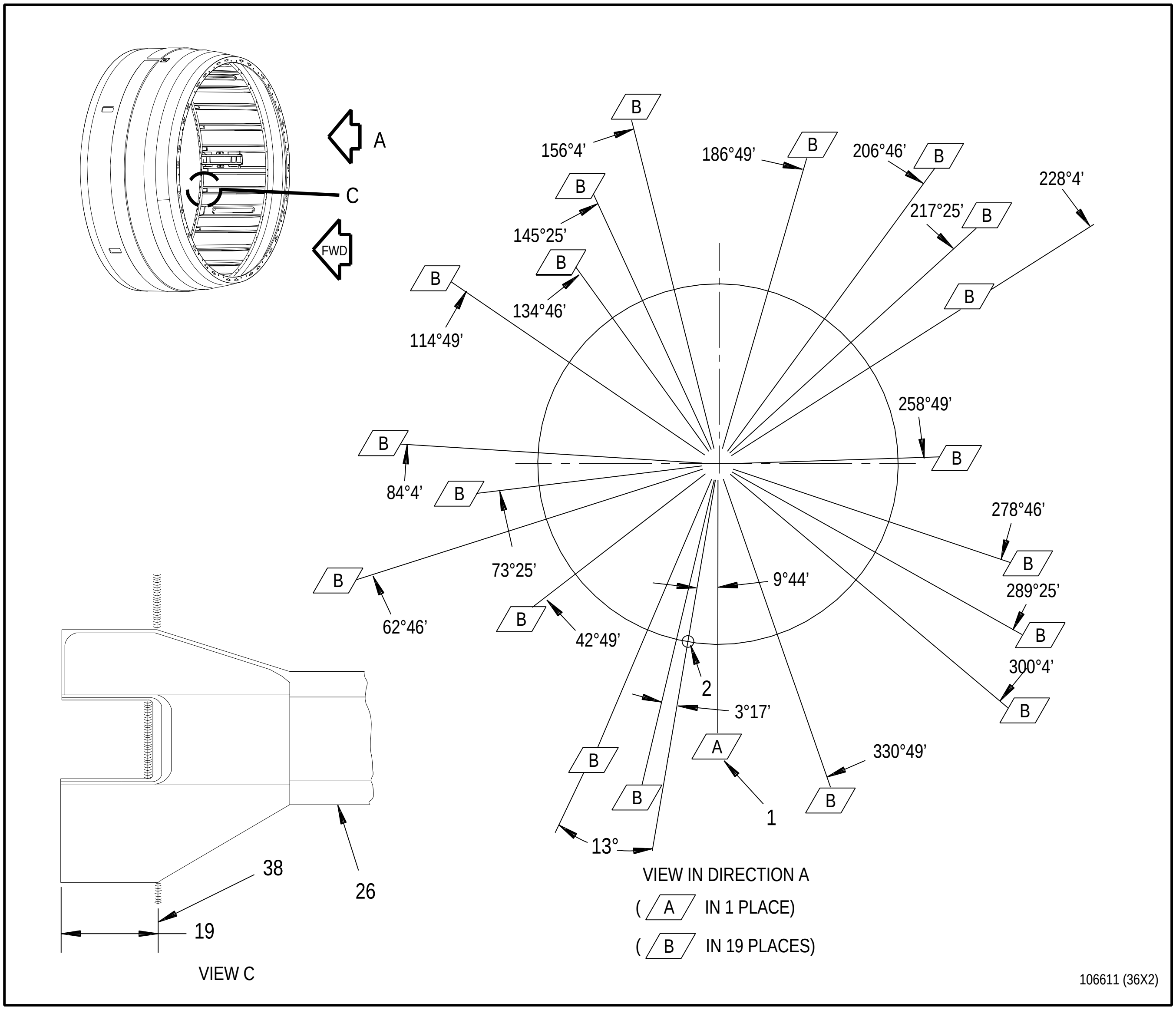


Figure 16. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location A and B (Sheet 1 of 3)

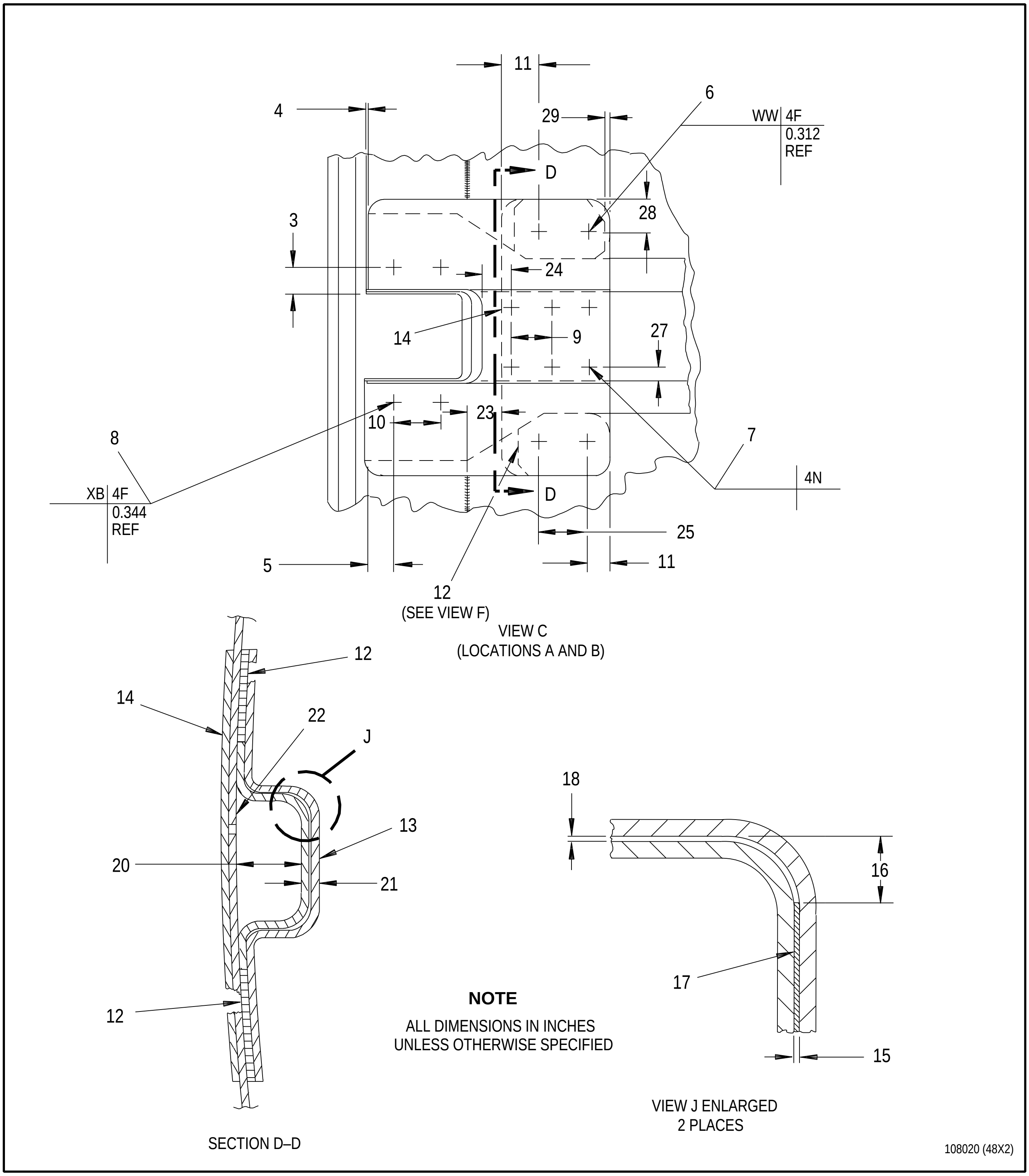


Figure 16. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location A and B (Sheet 2 of 3)

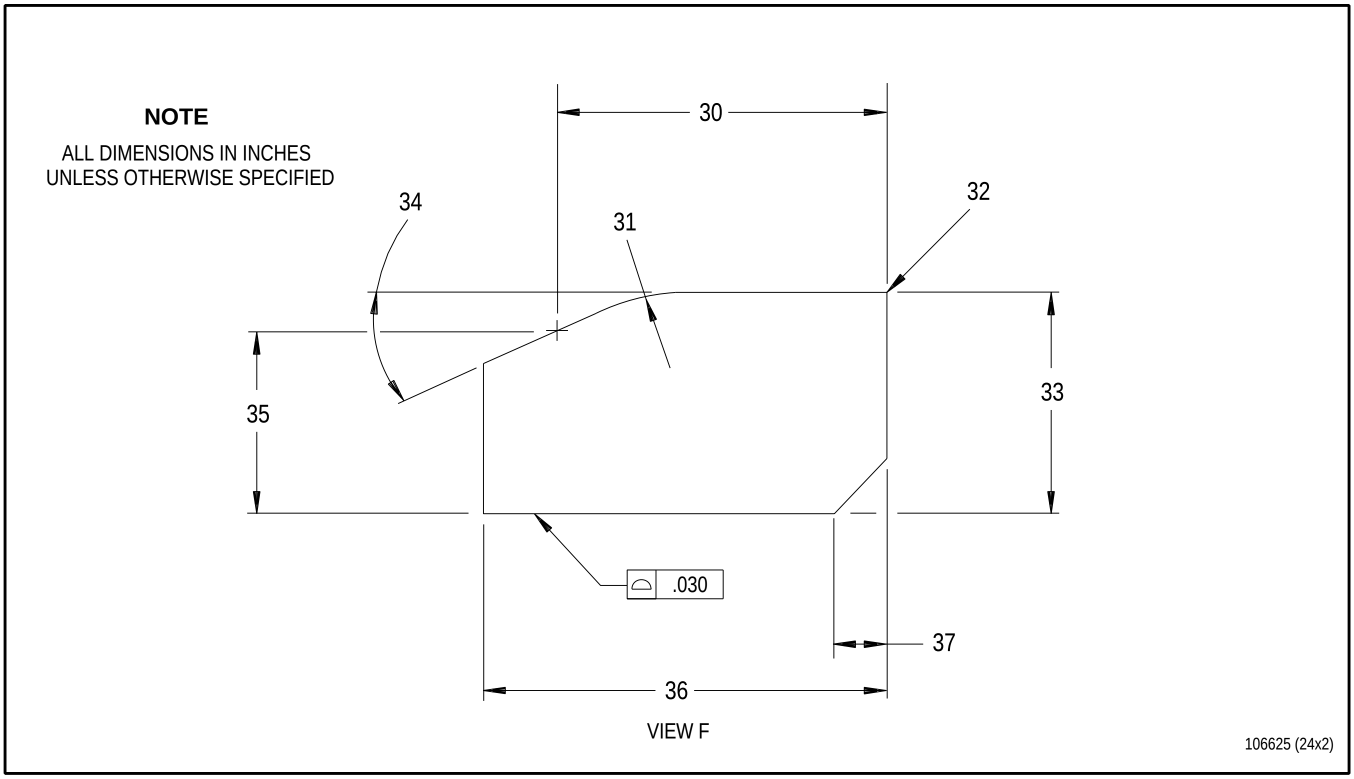


Figure 16. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location A and B (Sheet 3 of 3)

Legend for figure 16

1. Vertical centerline (reference). Drain boss may be used as locating feature.
2. 0.3135 inch diameter hole BC in aft flange, reference. Datum is centerline of hole.
3. 0.270 inch, typical, distance to existing stiffener rivet holes
4. 0.000 to 0.050 inch
5. 0.280 inch, typical, distance to existing stiffener rivet holes
6. PN MS9319-100, rivet, four required for each location A or B as necessary, through doubler, shim, skin, and patch plate. Locate manufactured head on far side.
7. PN NAS9307M-4-02, NAS9307M-4-03. ST1173-02 or ST1173-03; rivet, six required through doubler and stiffener only. Locate manufactured head on near side.
8. PN AN123399, rivet, four required per stiffener through doubler, stiffener, flange and patch plate. Locate manufactured head on far side.
9. 0.400 to 0.500 inch, typical
10. 0.400 inch, typical, distance between existing stiffener rivet holes
11. 0.280 inch, minimum, typical
12. Shim, locally fabricated from AMS 4911 titanium alloy (0.019 to 0.028 inch thick). Reference View F in figure.
13. PN 4060313, doubler
14. Plate, locally fabricated per text from AMS 4911 titanium alloy (0.014 to 0.018 inch thick).
15. Gap, 0.010 inch, maximum after shims installed
16. 0.125 to 0.150 inch, 2 places
17. Shim material, AMS 4911 titanium alloy, 0.015 through 0.070 inch thick, as required
18. Gap, equal both sides, 0.070 inch maximum (reference)
19. Zone X
20. Blind clearance
21. Thickness of assembly
22. Nozzle support
23. 0.600 to 0.640 inch
24. 0.140 inch minimum
25. 0.400 to 0.500 inch, typical
26. Stiffener, forward end, typical
27. 0.200 inch, minimum, both sides
28. 0.280 inch minimum, typical both sides
29. 0.010 inch, maximum gap between shim and doubler
30. 0.900 inch
31. 0.625 inch modified radius
32. 0.070 inch break edge, 3 places
33. 0.590 inch
34. 23.3°
35. 0.495 inch
36. 1.100 inch
37. Chamfer, 0.145 X 45°
38. Centerline, existing circumferential weld

17. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPAIR OF STIFFENER FORWARD END CRACKS AT LOCATION C.
(See Figure 17.)

CAUTION

This repair is not intended for cracks outside Zone X(20, Figure 17). Using this repair for cracks outside Zone X(20) can severely damage part.

a. Remove guide track per paragraph 13.

b. Remove existing stiffener rivets at forward end. Refer to T.O. 2-1-111.

c. Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

CAUTION

Stop drilling through a circumferential weld will cause severe damage to part.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in these procedures.

d. Stop drill cracks with a 0.120 to 0.130 inch drill bit. Do not drill in circumferential fusion welds.

e. Deburr all holes.

f. Fluorescent penetrant inspect(FPI) per SPOP 70 to ensure cracks have been properly stop drilled. Refer to T.O. 2-1-111.

NOTE

It is recommended that repair patches for adjacent distress areas be combined into single patch.

g. Determine patch size to not exceed 200 square inches OD. Total area repaired for each support should not exceed 850 square inches OD.

CAUTION

Failure to install shims will result in hardware damage during rivet installation.

NOTE

AMS 4916 or AMS 4901 (commercially-pure titanium) may be used as alternate material for shims.

h. Fit doubler(12) over existing stiffener as shown and trim as necessary to clear guide track spacer(9).

i. Measure gap(16).

j. Select proper thickness of shim(18) to fill gap. Install shim while maintaining dimension(17). Remaining clearance of gap(16) shall not exceed 0.010 inch after shim(18) is installed.

k. Clamp doubler(12) and shim(18) to existing stiffener. Doubler may be located off centerline of stiffener (away from guide track) in violation of dimension(19), if necessary to keep rivet head out of doubler radius while attempting to meet dimension(3).

NOTE

PN NAS9307M is preferred rivet.

l. Measure thickness of assembly to be riveted(22). If thickness is equal to or less than 0.125, use rivets with a -02 length suffix on their part number. If this value is greater than 0.125, use rivets with a -03 length suffix on their part number.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for this procedure.

m. Drill six 0.128 to 0.132 inch diameter rivet holes through top of stiffener.

n. Deburr all holes.

o. Install rivets(33). Refer to T.O. 2-1-111.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for this procedure.

p. Drill 0.128 to 0.132 inch diameter rivet holes through top of stiffener.

q. Deburr all holes.

r. Install rivets(33). Refer to T.O. 2-1-111.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for this procedure.

s. Drill 0.128 to 0.132 inch diameter rivet holes through doubler, stiffener, and support. For rivets(32), line drill holes through existing stiffener rivet holes. Refer to T.O. 2-1-111, except minimum edge distance is waived unless otherwise specified.

t. Position plate(14) on exterior of nozzle support and line drill 0.128 to 0.132 inch diameter rivet holes through plate. Line drill through holes created in previous step. Refer to T.O. 2-1-111. Minimum edge distance is waived unless otherwise specified.

u. Deburr all rivet holes.

v. Prepare patch plate and mating surface of support as follows:

(1) Lightly hand polish contacting surfaces of patch plate and mating surface of support with No. 240 silicon carbide abrasive paper.

(2) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(3) Apply PWA 556 primer per paragraph 12. Refer to T.O. 2-1-111.

(4) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

(a) PWA 36047 (DC93-076) per paragraph 12.

(b) PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

w. Install patch plate in position and install rivets(32) and (34) immediately after applying sealant. Maximum gap (sheet separation) between rivets shall not exceed 0.050 inch. Refer to T.O. 2-1-111.

x. Clean excess sealant, using PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If upset head of rivets underneath guide track(34) need to be shortened to allow for clearance of guide track, follow step y., otherwise, proceed to step z.

y. Grind upset head on rivets(34) to a minimum height of 0.062 inches. Refer to T.O. 2-1-111.

z. Reinstall guide track per paragraph 13.

NOTE

PWA 617 or PWA 36003-1 adhesives require moisture to cure fully. Optimum curing conditions are 50% relative humidity at 75°F or equivalent moisture level.

aa. Cure assembly at room temperature for 24 hours before handling.

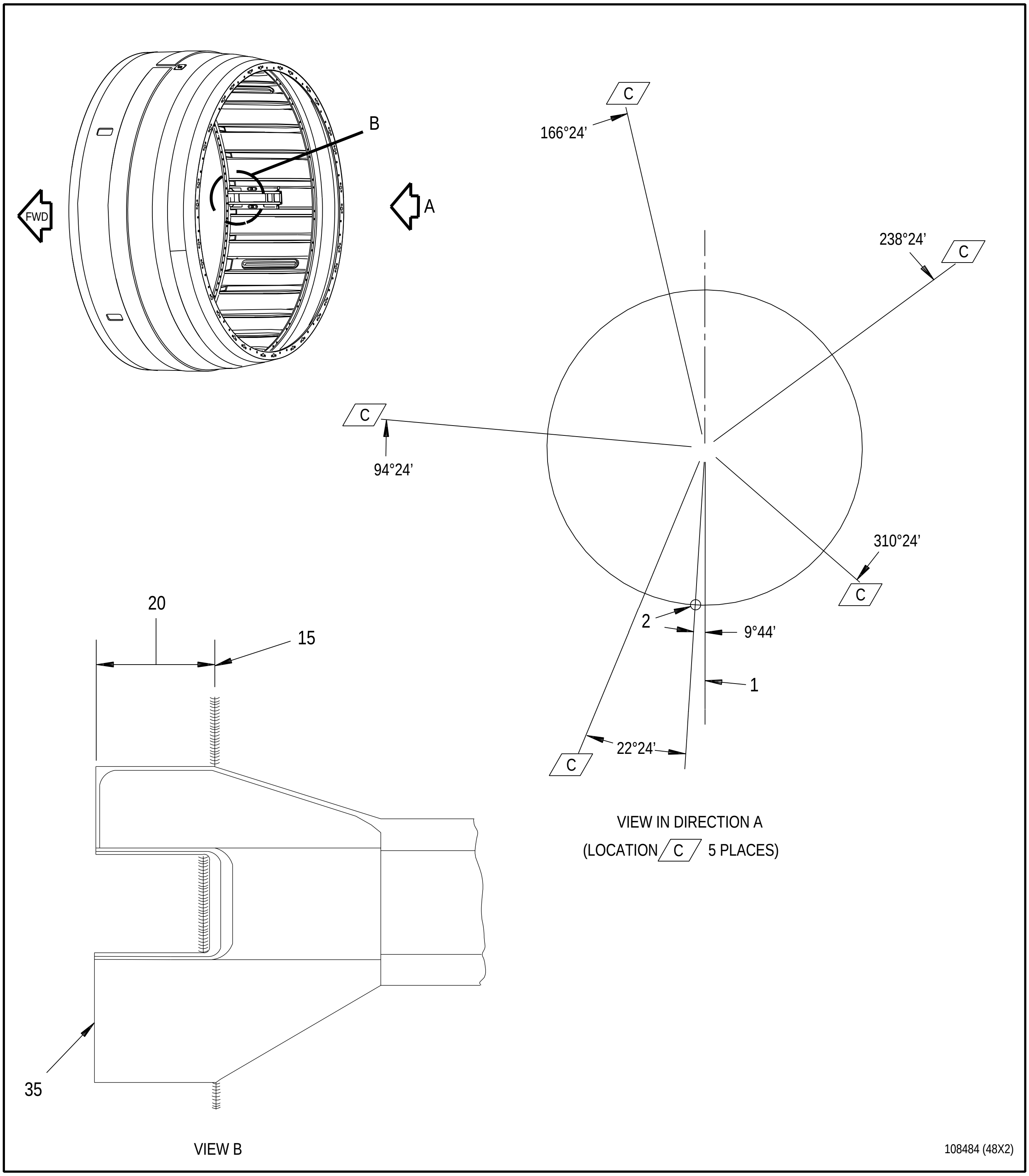


Figure 17. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location C (Sheet 1 of 3)

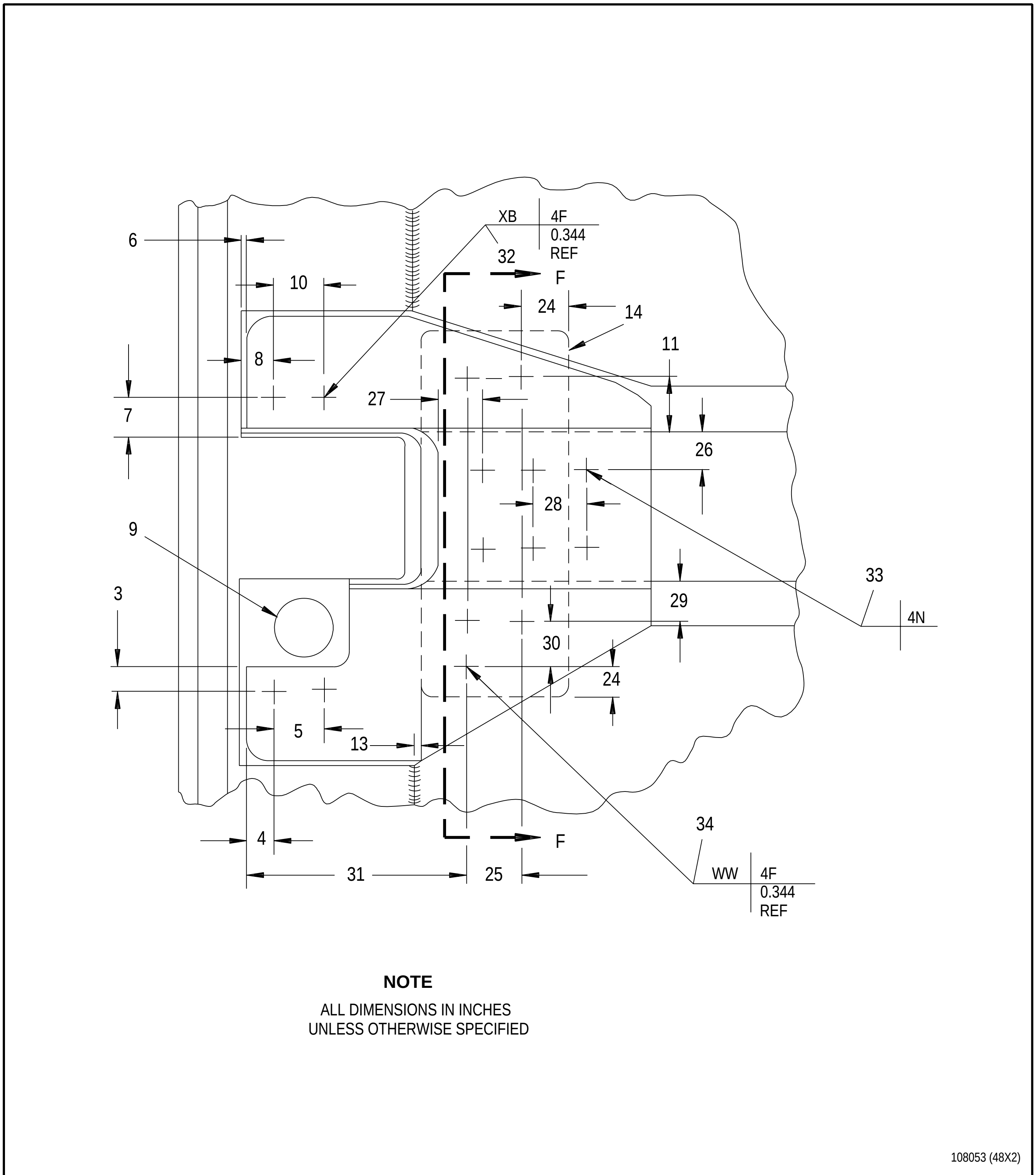
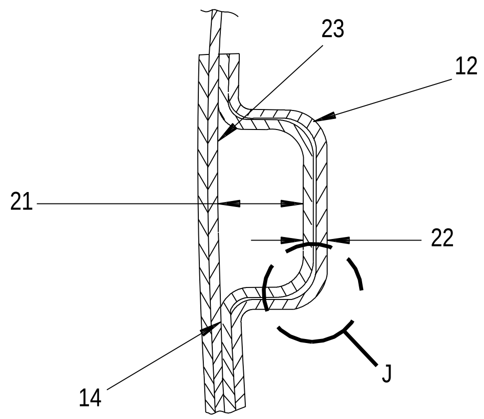
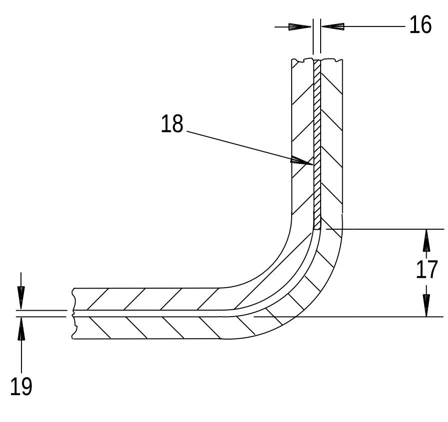


Figure 17. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location C (Sheet 2 of 3)



SECTION F–F



VIEW J
2 PLACES

108054 (48X2)

Figure 17. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location C (Sheet 3 of 3)

Legend for figure 17

1. Vertical centerline (reference). Drain boss may be used as locating feature.
2. 0.3135 inch diameter hole BC in aft flange, reference. Datum is centerline of hole.
3. 0.240 to 0.260 inch
4. 0.280 to 0.290 inch
5. 0.390 to 0.410 inch
6. 0.010 inch max gap
7. 0.270 inch, typical to existing stiffener rivet holes
8. 0.280 inch, typical to existing stiffener rivet holes
9. PN 4080514, spacer, reference
10. 0.400 inch, typical, distance between existing stiffener rivet holes
11. 0.315 to 0.335 inch
12. PN 4084885, doubler
13. 0.020 inch maximum, distance of plate edge to circumferential weld centerline
14. Plate, locally fabricated per text from AMS 4911 titanium alloy (0.014 to 0.018 inch thick)
15. Existing circumferential weld
16. Gap, 0.010 inch maximum after shims installed
17. 0.125 to 0.150 inch, 2 places
18. Shim material locally fabricated from AMS 4911 titanium alloy, 0.015 through 0.075 inch thick, as required.
19. Gap, equal both sides (0.070 inch maximum, reference)
20. Zone X
21. Blind clearance
22. Thickness of assembly
23. Nozzle support
24. 0.280 inch minimum, typical both sides
25. 0.390 to 0.410 inch
26. 0.200 inch, minimum, both sides
27. 0.140 inch, minimum
28. 0.400 to 0.500 inch, typical
29. 0.315 to 0.335 inch
30. 0.390 to 0.410 inch.
31. 1.445 to 1.465 inch.
32. PN AN123399, rivet, four per stiffener required through doubler, stiffener, and flange. Locate manufactured head on far side.
33. PN NAS9307M-4-02, NAS9307M-4-03, ST1173-02 or ST1173-03; rivet, six required through stiffener and doubler only. Locate manufactured head on near side.
34. PN MS9319-101, rivet, five required through doubler, stiffener, skin, and patch plate. Locate manufactured head on far side.
35. Stiffener, forward end, typical.

18. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPAIR OF STIFFENER FORWARD END CRACKS AT LOCATION D.

(See Figure 18.)

CAUTION

This repair is not intended for cracks outside Zone X(20, Figure 18). Using this repair for cracks outside Zone X(20) can severely damage part.

a. Remove guide track per paragraph 13.

b. Remove existing stiffener rivets at forward end. Refer to T.O. 2-1-111.

c. Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

CAUTION

Stop drilling through a circumferential fusion weld can cause severe damage to part.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in these procedures.

d. Stop drill ends of crack using 0.120 to 0.130 inch diameter drill bit. Do not stop drill in circumferential fusion welds.

e. Deburr all holes.

f. Fluorescent penetrant inspect(FPI) per SPOP 70 to make sure cracks have been properly stop drilled. Refer to T.O. 2-1-111.

NOTE

It is recommended that repair patches for adjacent distress areas be combined into single patch.

g. Determine patch size to not exceed 200 square inches OD. Total area repaired for each support should not exceed 850 square inches OD.

CAUTION

Failure to install shims will result in hardware damage during rivet installation.

NOTE

AMS 4916 or AMS 4901 (commercially-pure titanium) may be used as alternate material for shims.

h. Fit doubler(12) over existing stiffener as shown. Trim as necessary to clear guide track spacer(9).

i. Measure gap(16).

j. Select proper thickness of shim(18) and install to fill gap. Maintain dimension(17). Remaining clearance of gap(16) shall not exceed 0.010 inch after shim(18) is installed.

k. Clamp doubler(12) and shim(18) to existing stiffener. Doubler may be located off centerline of stiffener (away from guide track) in violation of dimension(19), if necessary to keep rivet head out of doubler radius.

NOTE

PN NAS9307M is preferred rivet.

l. Measure thickness of assembly to be riveted(22). If thickness is equal to or less than 0.125 inch, use rivets with a part number length suffix of -02 on their part number. If thickness exceeds 0.125 inch, use rivets with a length suffix of -03 on their part number.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

m. Drill six 0.128 to 0.132 inch diameter rivet holes through top of stiffener.

n. Deburr all rivet holes.

o. Install rivets(33). Refer to T.O. 2-1-111.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

p. Drill 0.128 to 0.132 inch diameter rivet holes through doubler, shims, stiffener and support. For rivets(32), line drill the holes through the existing stiffener rivet holes. Refer to T.O. 2-1-111, except minimum edge distance is waived unless otherwise specified.

q. Position plate(14) on exterior of nozzle support and line drill 0.128 to 0.132 inch diameter rivet holes through plate. Line drill through holes created in previous step. Refer to T.O. 2-1-111, except minimum edge distance is waived unless otherwise specified.

r. Deburr all rivet holes.

s. Prepare patch plate and mating surface of support as follows:

(1) Lightly hand polish contacting surfaces of support and patch plate with No. 240 silicon carbide abrasive paper.

(2) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(3) Apply PWA 556 primer per paragraph 12. Refer to T.O. 2-1-111.

(4) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

(a) PWA 36047 (DC 93-076) per paragraph 12.

(b) PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

t. Clamp plate in position and install rivets(32) and (34) immediately after applying sealant. Maximum gap (sheet separation) between rivets shall not exceed 0.050 inch. Refer to T.O. 2-1-111.

u. Clean excess sealant, using PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If upset head of rivets underneath guide track(34) need to be shortened to allow for clearance of guide track, follow step v., otherwise proceed to step w.

v. Grind upset head on rivets(34) to a minimum height of 0.062 inches. Refer to T.O. 2-1-111.

w. Reinstall guide track per paragraph 13.

NOTE

PWA 617 or PWA 36003-1 adhesives require moisture to cure fully. Optimum curing conditions are 50% relative humidity at 75°F or equivalent moisture level.

x. Cure assembly at room temperature for 24 hours before handling.

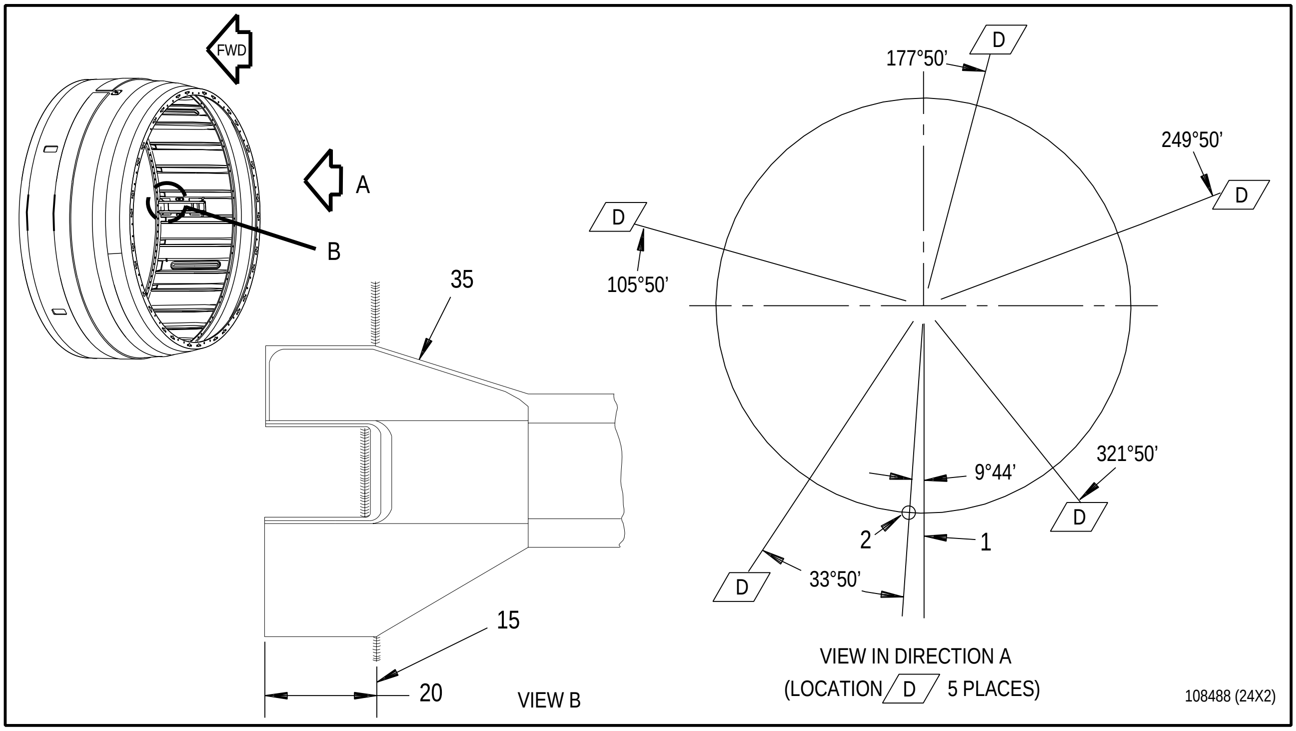


Figure 18. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location D (Sheet 1 of 3)

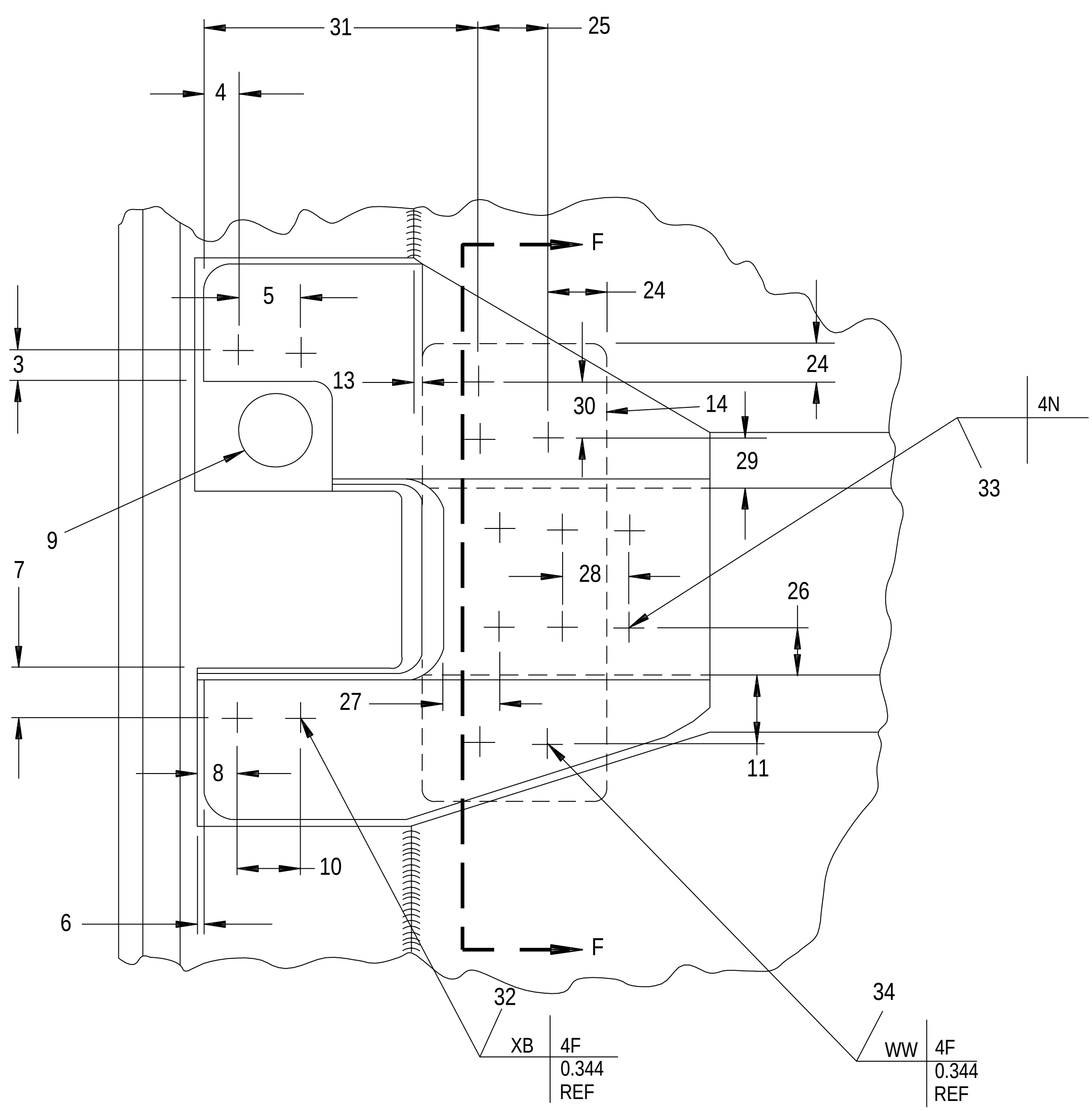


Figure 18. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location D (Sheet 2 of 3)

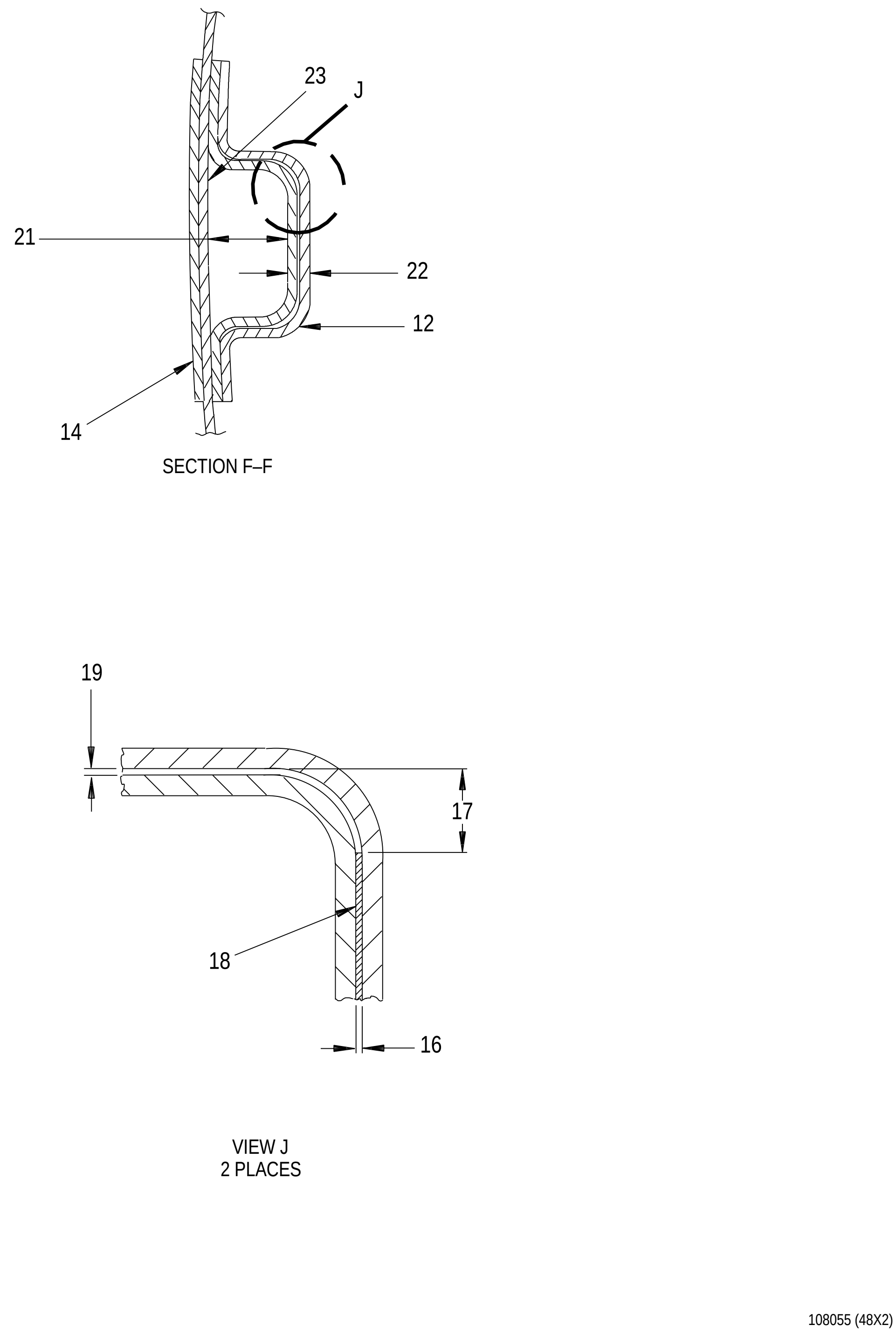


Figure 18. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location D (Sheet 3 of 3)

Legend for figure 18

1. Vertical centerline (reference). Drain boss may be used as locating feature.
2. 0.3135 inch diameter hole BC in aft flange, reference. Datum is centerline of hole.
3. 0.240 to 0.260 inch
4. 0.280 to 0.290 inch
5. 0.390 to 0.410 inch
6. 0.010 inch max gap
7. 0.270 inch, typical to existing stiffener rivet holes
8. 0.280 inch, typical to existing stiffener rivet holes
9. PN 4080514, spacer, reference
10. 0.400 inch, typical, distance between existing stiffener rivet holes
11. 0.315 to 0.335 inch
12. PN 4084884, doubler
13. 0.020 inch maximum, distance of plate edge to circumferential weld centerline
14. Plate, locally fabricated per text from AMS 4911 titanium alloy (0.014 to 0.018 inch thick)
15. Existing circumferential weld
16. Gap, 0.010 inch maximum after shims installed
17. 0.125 to 0.150 inch, 2 places
18. Shim material locally fabricated from AMS 4911 titanium alloy, 0.015 through 0.075 inch thick, as required.
19. Gap, equal both sides (0.070 inch maximum, reference)
20. Zone X
21. Blind clearance
22. Thickness of assembly
23. Nozzle support
24. 0.280 inch minimum, typical, both sides
25. 0.390 to 0.410 inch
26. 0.200 inch, minimum, both sides
27. 0.140 inch, minimum
28. 0.400 to 0.500 inch, typical
29. 0.315 to 0.335 inch
30. 0.390 to 0.410 inch
31. 1.445 to 1.465 inch
32. PN AN123399, rivet, four per stiffener required through doubler, stiffener, and flange. Locate manufactured head on far side.
33. PN NAS9307M-4-02, NAS9307M-4-03, ST1173-02 or ST1173-03; rivet, six required through stiffener and doubler only. Locate manufactured head on near side.
34. PN MS9319-101, rivet, five required through doubler, stiffener, skin, and patch plate. Locate manufactured head on far side.
35. Stiffener, forward end, typical

19. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPAIR OF STIFFENER FORWARD END CRACKS AT LOCATION E.

(See Figure 19.)

CAUTION

This repair is not intended for cracks outside Zone X(21, Figure 19). Using this repair for cracks outside Zone X(21) can severely damage part.

a. Remove existing stiffener rivets at forward end. Refer to T.O. 2-1-111.

b. Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

CAUTION

Stop drilling through a circumferential fusion weld can cause severe damage to part.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in these procedures.

c. Stop drill ends of crack using 0.120 to 0.130 inch diameter drill bit. Do not stop drill in circumferential fusion welds.

d. Deburr all holes.

e. Fluorescent penetrant inspect(FPI) per SPOP 70 to make sure cracks have been properly stop drilled. Refer to T.O. 2-1-111.

NOTE

It is recommended that repair patches for adjacent distress areas be combined into single patch.

f. Determine patch size to not exceed 200 square inches OD. Total area repaired for each support should not exceed 850 square inches OD.

CAUTION

Failure to install shims will result in hardware damage during rivet installation.

NOTE

AMS 4916 or AMS 4901 (commercially-pure titanium) may be used as alternate material for shims.

g. Select proper thickness of shim(12) to fill gap. Position shims as shown.

h. Fit doubler(13) over existing stiffener as shown.

i. Measure gap(19).

j. Select proper thickness of shim(18) and install to fill gap. Maintain dimension(17). Remaining clearance of gap(19) shall not exceed 0.010 inch after shim(18) is installed.

k. Clamp doubler(13) and shim(18) to existing stiffener.

NOTE

PN NAS9307M is preferred rivet.

l. Measure thickness of assembly to be riveted(20). If thickness is equal to or less than 0.125 inch, use rivets with a part number length suffix of -02 on their part number. If thickness exceeds 0.125 inch, use rivets with a length suffix of -03 on their part number.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

m. Drill six 0.128 to 0.132 inch diameter rivet holes through top of stiffener.

n. Deburr all rivet holes.

o. Install rivets(26). Refer to T.O. 2-1-111.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

p. Drill 0.128 to 0.132 inch diameter rivet holes through doubler, shims, stiffener, and support. For rivets(25), line drill the holes through the existing stiffener rivet holes. Refer to T.O. 2-1-111, except minimum edge distance is waived, unless otherwise specified.

q. Position plate(14) on exterior of nozzle support and line drill 0.128 to 0.132 inch diameter rivet holes through plate. Line drill through the stiffener rivet holes. Refer to T.O. 2-1-111, except minimum edge distance is waived unless otherwise specified.

r. Deburr all rivet holes.

s. Prepare patch plate and mating surface of support as follows:

(1) Lightly hand polish contacting surfaces of support and patch plate with No. 240 silicon carbide abrasive paper.

(2) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(3) Apply PWA 556 primer per paragraph 12. Refer to T.O. 2-1-111.

(4) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

(a) PWA 36047 (DC 93-076) per paragraph 12.

(b) PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

t. Clamp plate in position and install rivets(25) and (27) immediately after applying sealant. Maximum gap (sheet separation) between rivets shall not exceed 0.050 inch. Refer to T.O. 2-1-111.

u. Clean excess sealant, using PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

PWA 617 or PWA 36003-1 adhesives require moisture to cure fully. Optimum curing conditions are 50% relative humidity at 75°F or equivalent moisture level.

v. Cure assembly at room temperature for 24 hours before handling.

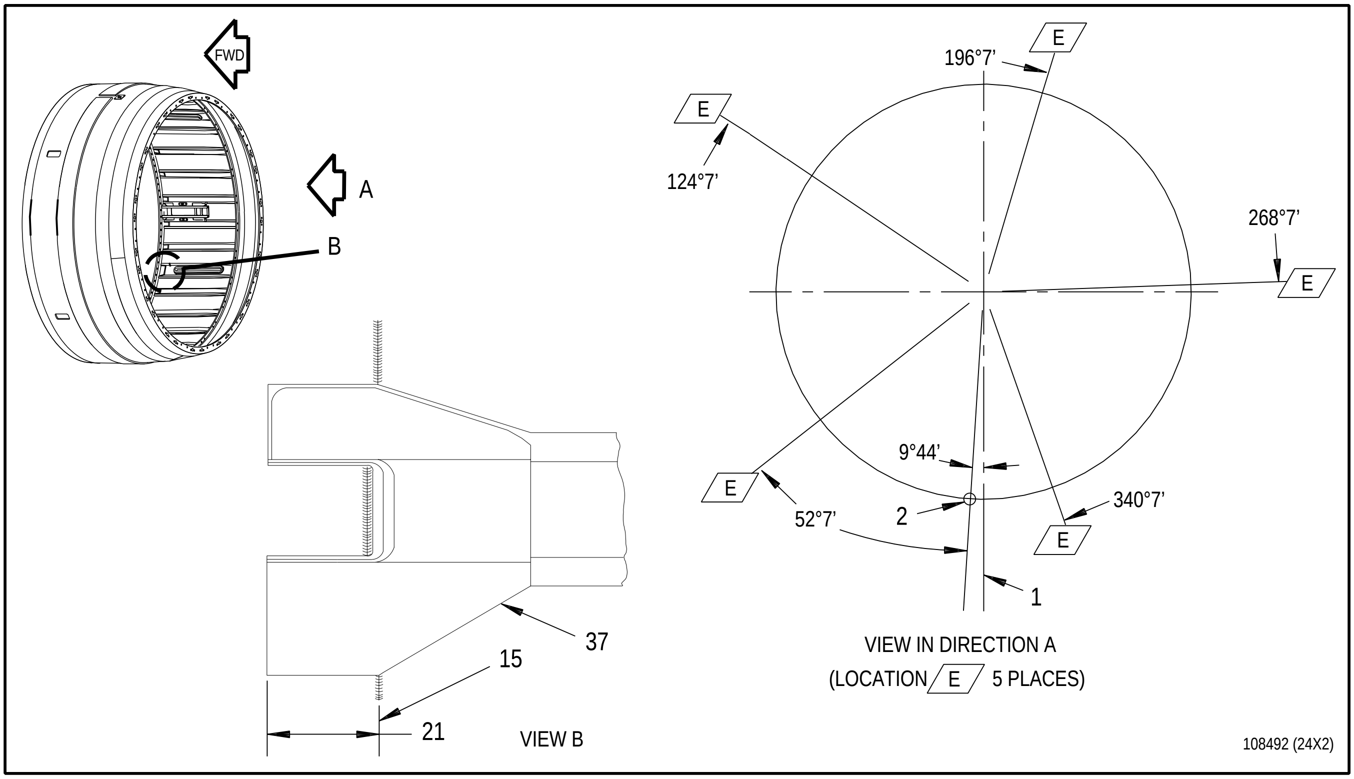
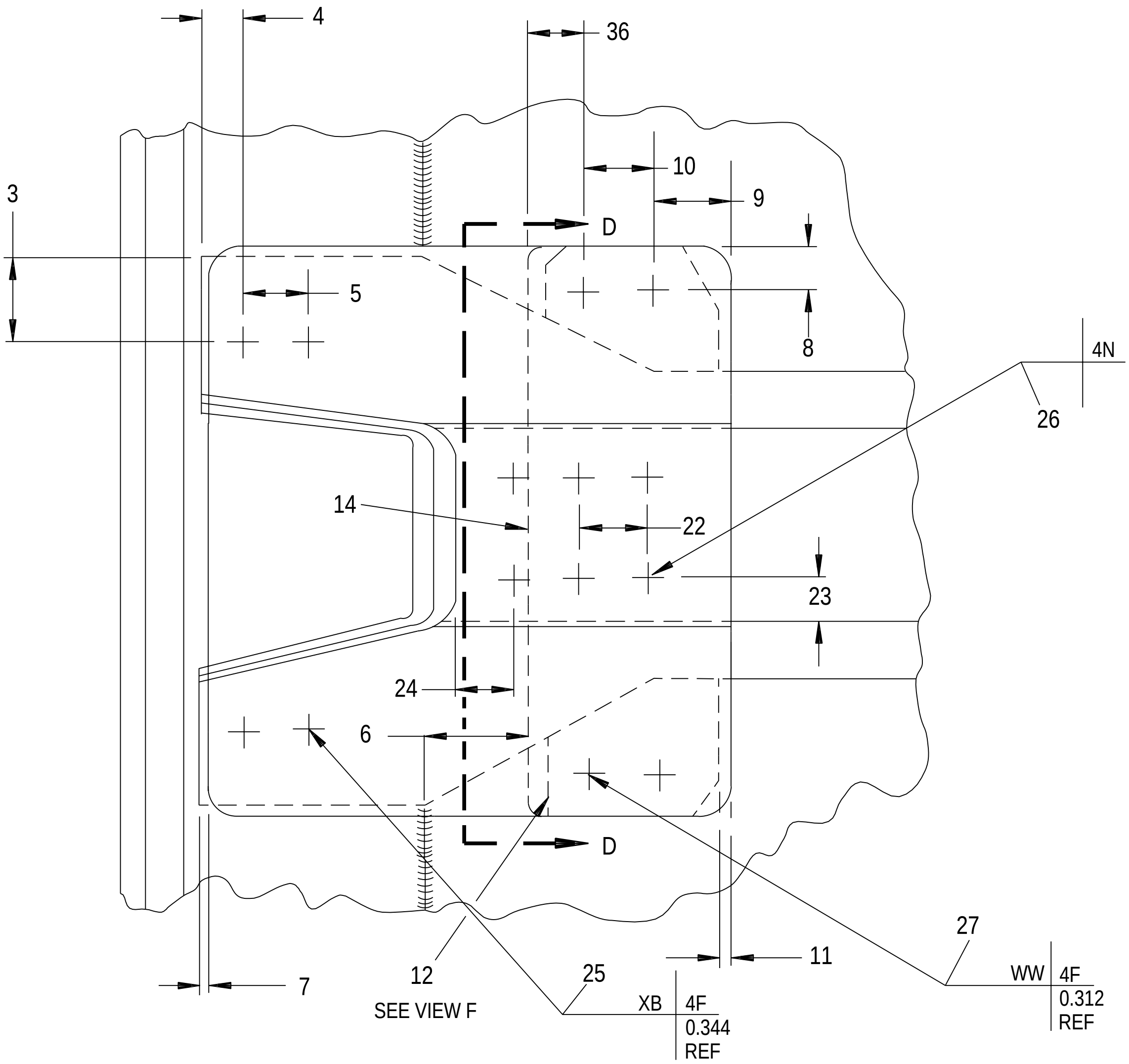


Figure 19. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location E (Sheet 1 of 4)



NOTE

ALL DIMENSIONS IN INCHES
UNLESS OTHERWISE SPECIFIED

108059 (48X2)

Figure 19. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location E (Sheet 2 of 4)

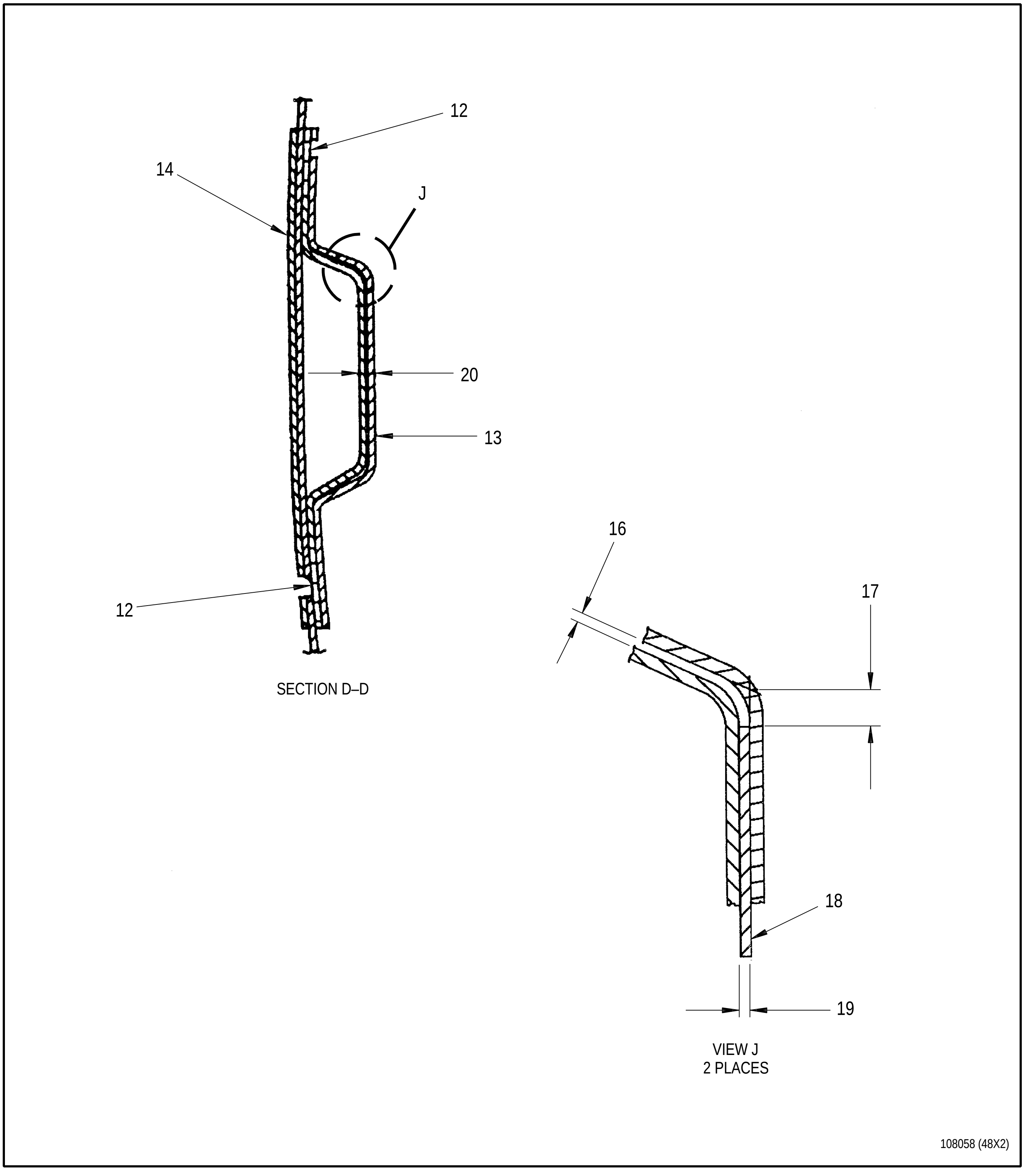


Figure 19. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location E (Sheet 3 of 4)

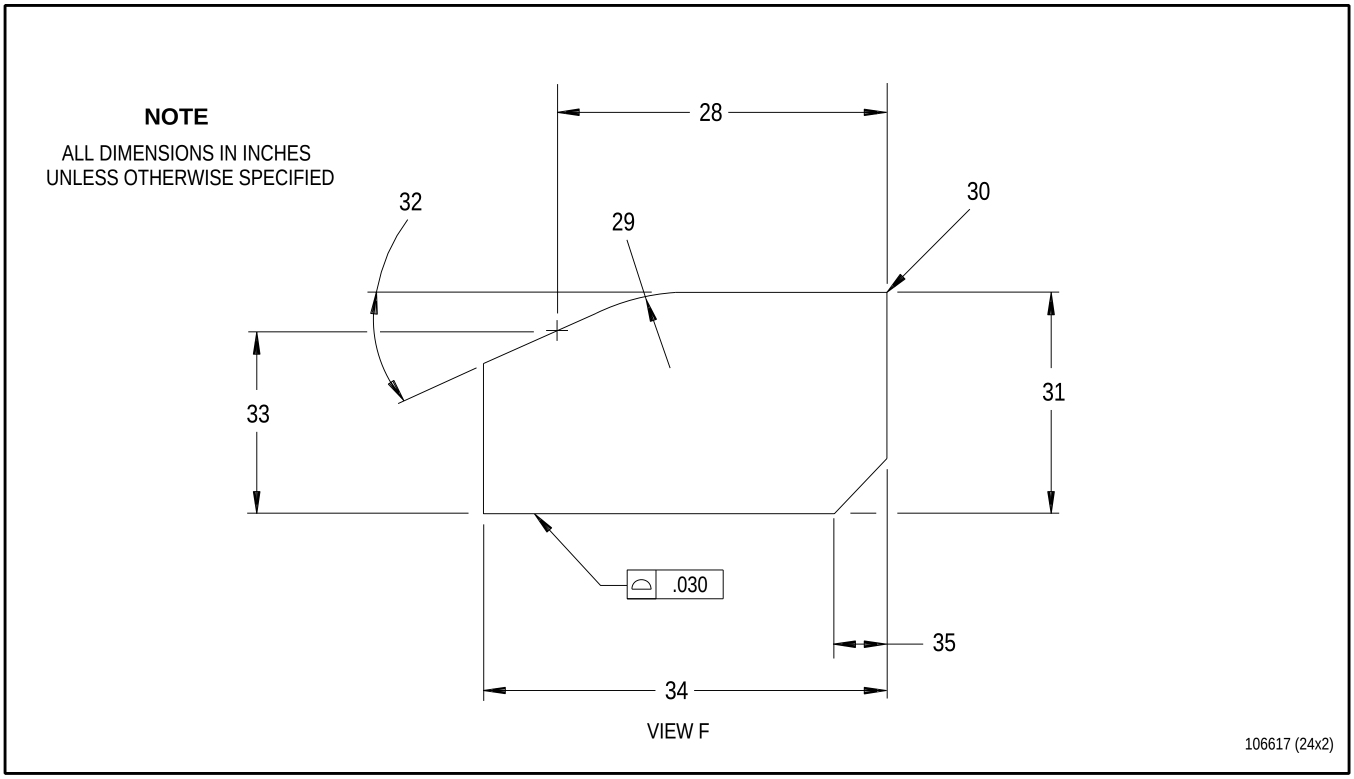


Figure 19. Augmentor Nozzle Support Assembly - Repair of Stiffener Forward End Cracks at Location E (Sheet 4 of 4)

Legend for figure 19

1. Vertical centerline (reference). Drain boss may be used as locating feature.
2. 0.3135 inch diameter hole BC in aft flange, reference. Datum is centerline of hole.
3. 0.520 inch, typical to existing stiffener rivet holes
4. 0.280 inch, typical to existing stiffener rivet holes
5. 0.400 inch, typical between existing stiffener rivet holes
6. 0.500 to 0.530 inch
7. 0.050 inch maximum gap
8. 0.280 inch, minimum, typical, both sides
9. 0.280 inch, minimum, typical, both sides
10. 0.390 to 0.410 inch, typical
11. 0.050 inch maximum gap, both shims, both sides
12. Shim, locally fabricated from AMS 4911 titanium alloy (0.024 to 0.036 inch thick). Reference View F in figure.
13. PN 4060316, doubler
14. Plate, locally fabricated per text from AMS 4911 titanium alloy (0.014 to 0.018 inch thick)
15. Centerline, existing circumferential weld
16. Equal gap both sides (0.050 inch maximum reference)
17. 0.125 to 0.150 inch, 2 places
18. Shim material locally fabricated from AMS 4911 titanium alloy, 0.015 through 0.075 inch thick, as required
19. Gap, 0.010 inch maximum after shims installed
20. Thickness of assembly
21. Zone X
22. 0.400 to 0.500 inch, typical
23. 0.200 inch minimum, both sides
24. 0.140 inch minimum
25. PN AN123399, rivet, four required per stiffener through doubler, stiffener, and flange. Locate manufactured head on far side.
26. PN NAS9307M-4-02, NAS9307M-4-03, ST1173-02 or ST1173-03, rivet, six required through doubler and stiffener only. Locate manufactured head on near side.
27. PN MS9319-100, rivet, four required through doubler, shim, skin, and patch plate. Locate manufactured head on far side.
28. 0.900 inch
29. 0.625 inch modified radius
30. 0.070 inch break edge, 3 places
31. 0.590 inch
32. 23.3°
33. 0.495 inch
34. 1.100 inches
35. Chamfer, 0.145 x 45°
36. 0.280 inch, minimum, typical, both sides
37. Stiffener, forward end, typical

20. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - BLEND REPAIR OF EDGE NICKS AND TEARS AROUND ACCESS HOLES.

a. Remove nozzle support guide or protect guide using shim stock. Refer to paragraph 13 for guide removal procedures.

b. Blend repair damage in nozzle support assembly skin and surrounding stiffeners up to 0.250 inch in length and 0.050 inch depth into skin or stiffener. Refer to T.O. 2-1-111.

c. Reinstall nozzle support guide or remove protective shim stock as required. Refer to paragraph 13 for guide installation procedures.

21. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPAIR OF DAMAGE AROUND NOZZLE SUPPORT GUIDES BETWEEN FORWARD FLANGE AND RUBSTRIP (METHOD I) AND BETWEEN MID FLANGE AND RUBSTRIP (METHOD II).
(See Figures 20 and 21.)

a. Two methods are available for repair of various types of damage to augmentor nozzle support assembly around nozzle support guides.

(1) Method I is to be used in areas around the nozzle support guides between the forward flange and rubstrip. See Figure 20.

(2) Method II is to be used in areas around the nozzle support guides between the rubstrip and mid flange. See Figure 21.

b. Perform Method I repair as follows: (See figure 20.)

(1) Remove existing rivets(22) securing nozzle support guide per paragraph 9 and remove nozzle support guide as well as the stiffener forward end rivets(17). Discard rivets.

(2) Cut out minimum amount of skin material to remove damage as shown in figure 20.

(3) Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedures.

(4) Stop drill ends of cracks using a 0.120 to 0.130 inch diameter drill.

(5) Deburr all holes.

(6) Fluorescent penetrant inspect(FPI) per SPOP 70 to make sure cracks have been properly stop drilled. Refer to T.O. 2-1-111.

NOTE

It is recommended that repair patches for adjacent distress areas be combined into single patch.

CAUTION

No rivets shall be located within 0.280 inch of circumferential fusion welds.

(7) Lay out rivet pattern adjacent to crack on inside of support per requirements of figure 20. Maximum patch size should not exceed 200 square inches OD. Total area repaired for each support should not exceed 850 square inches OD.

NOTE

AMS 4916 or AMS 4901 (commercially-pure titanium) may be used as alternate material for patches.

(8) Determine patch plate size(20), based on rivet pattern requirements of step b.(7).

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

(9) Drill rivet holes through stiffeners, flange, and support. Line drill holes for rivets(17) and (22) through the existing stiffener rivet holes. Refer to T.O. 2-1-111.

(10) Position patch plate(20, figure 20) on exterior of nozzle support and line drill rivet holes through plate. Line drill through holes created in previous step. Refer to T.O. 2-1-111.

(11) Deburr all holes.

(12) Prepare patch and mating surface as follows:

(a) Lightly hand polish contacting surfaces of patch plate and mating surface of support with No. 240 silicon carbide abrasive paper.

(b) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(c) Apply PWA 556 primer per paragraph 12. Refer to T.O. 2-1-111.

(d) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

1 PWA 36047 (DC93-076) paragraph 12.

2 PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

(13) Clamp plate in position and install rivets(12), (16), (22), and (25) immediately after applying adhesive. Maximum gap (sheet separation) between rivets shall not exceed 0.050 inch. Minimum edge distance waived. Refer to T.O. 2-1-111.

(14) Clean excess sealant using PWA 83-B2. Refer to T.O. 2-1-111.

(15) Place nozzle support guide track into original position. Install rivets(22). Refer to T.O. 2-1-111.

NOTE

PWA 617 or PWA 36003-1 adhesives require moisture to cure completely. Optimum curing conditions are 50% relative humidity at 75°F or equivalent moisture level.

(16) Cure assembly at room temperature for 24 hours before handling.

c. Perform Method II repair as follows: (See figure 21.)

(1) Cut out minimum amount of skin material to remove damage as shown in figure 21.

(2) Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

(3) Stop drill ends of cracks using a 0.120 to 0.130 inch diameter drill.

(4) Deburr all holes.

(5) Fluorescent penetrant inspect(FPI) per SPOP 70 to make sure cracks have been properly stop drilled. Refer to T.O. 2-1-111.

NOTE

It is recommended that repair patches for adjacent distress areas be combined into single patch.

CAUTION

No rivets shall be located within 0.280 inch of circumferential fusion welds.

(6) Lay out rivet pattern adjacent to crack on inside of support per requirements of figure 21. Maximum patch size should not exceed 200 square inches OD. Total area repaired for each support should not exceed 850 square inches OD.

NOTE

AMS 4916 or AMS 4901 (commercially-pure titanium) may be used as alternate material for patches.

(7) Determine patch plate size(20), based on rivet pattern requirements of step c.(6).

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

(8) Drill rivet holes through stiffeners, flange, and support. Line drill holes for rivet(15) through the existing stiffener rivet holes. Refer to T.O. 2-1-111.

(9) Position patch plate(20) on exterior of nozzle support and line drill rivet holes through plate. Line drill through holes. Refer to T.O. 2-1-111.

(10) Cut hole in patch per figure 21, view B.

(11) Deburr all holes.

(12) Prepare patch and mating surface as follows:

(a) Lightly hand polish contacting surfaces of patch plate and mating surface of support with No. 240 silicon carbide abrasive paper.

(b) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(c) Apply PWA 556 primer per paragraph 12. Refer to T.O. 2-1-111.

(d) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

1 PWA 36047 (DC93-076) paragraph 12.

2 PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

(13) Clamp plate in position and install rivets immediately after applying adhesive. Maximum gap (sheet separation) between rivets shall not exceed 0.050 inch. Minimum edge distance waived. Refer to T.O. 2-1-111.

(14) Clean excess sealant using PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

PWA 617 or PWA 36003-1 adhesives require moisture to cure completely. Optimum curing conditions are 50% relative humidity at 75°F or equivalent moisture level.

(15) Cure assembly at room temperature for 24 hours before handling.

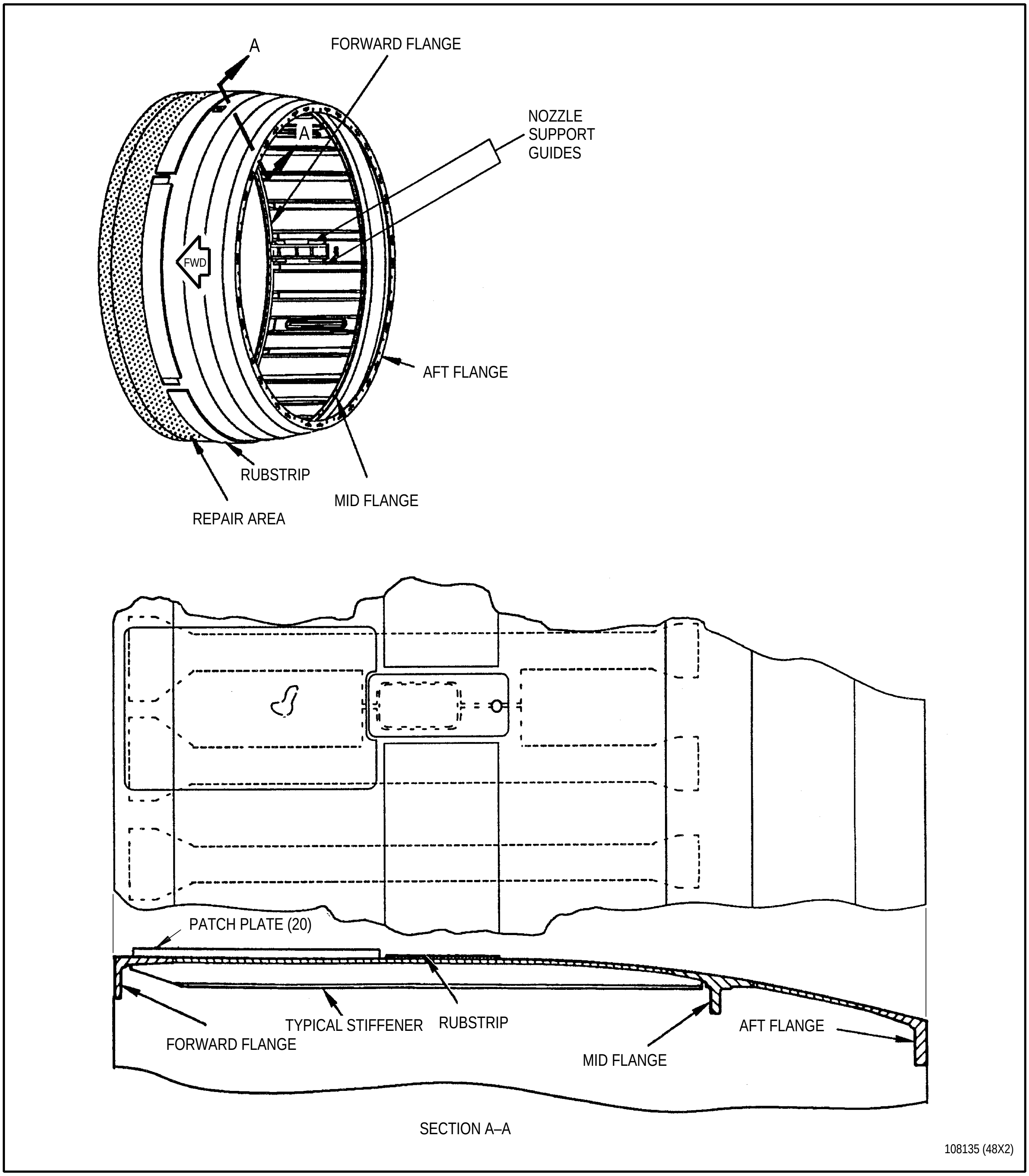


Figure 20. Augmentor Nozzle Support Assembly - Repair of Damage Around Nozzle Support Guides Between Forward Flange and Rubstrip - Method I (Sheet 1 of 2)

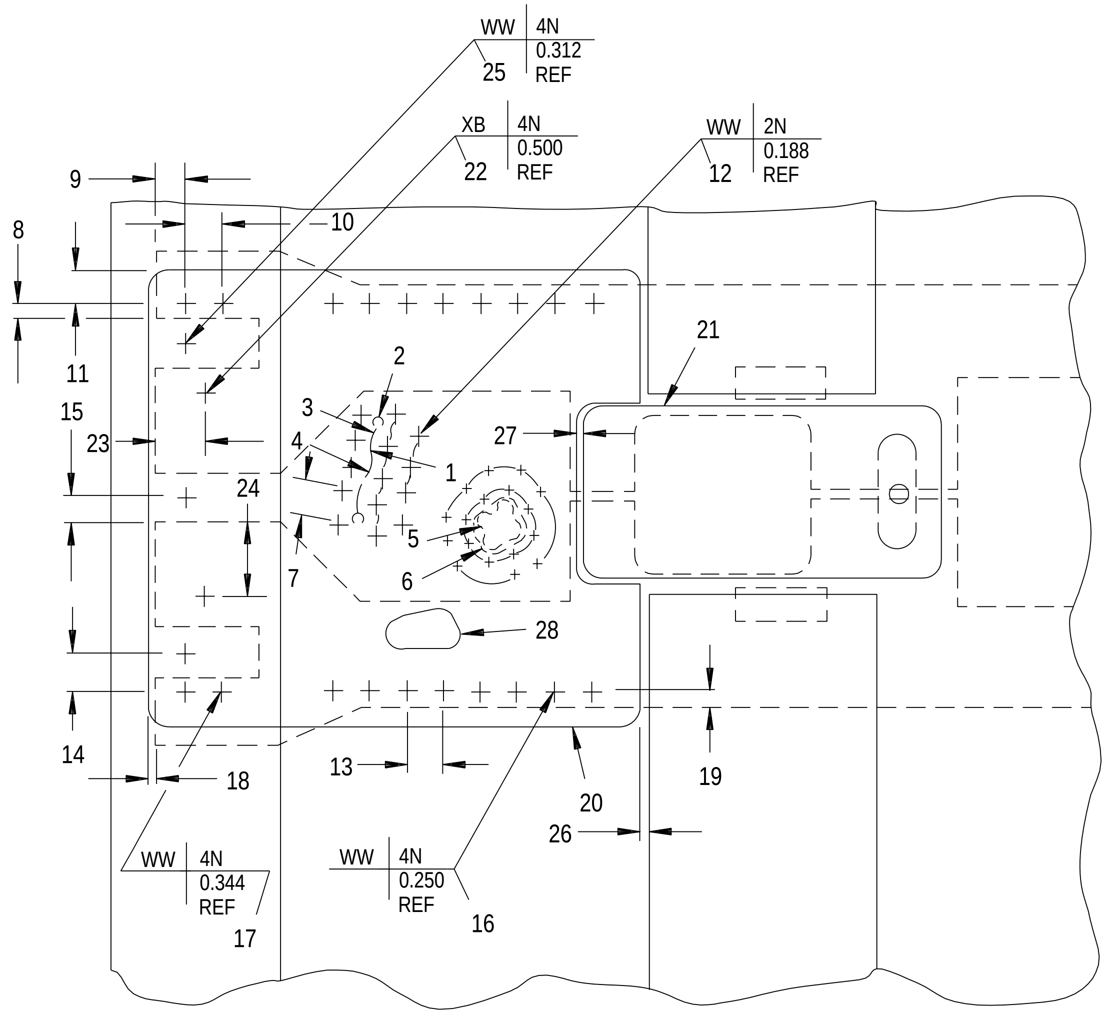


Figure 20. Augmentor Nozzle Support Assembly - Repair of Damage Around Nozzle Support Guides Between Forward Flange and Rubstrip - Method I (Sheet 2 of 2)

Legend for figure 20

1. Typical skin crack damage
2. Stop drill 0.120 to 0.130 inch diameter, as required.
3. 0.160 inch, typical from edge of crack or cut out
4. 0.400 to 0.500 inch, typical from closest edge of crack.
5. Typical damage
6. Cut out damaged area. Remove minimum amount of material 0.050 inch radius minimum.
7. 0.375 to 0.500 inch, typical
8. 0.270 inch, typical, to existing stiffener rivet holes
9. 0.280 inch, typical, to existing stiffener rivet holes
10. 0.400 inch, typical, between existing stiffener rivet holes
11. 0.280 inch, minimum, all sides
12. PN MS9319-004, rivet, as required through skin and patch plate only. Rivets shall be staggered between adjacent rows and spaced as shown. Locate manufactured head on near side.
13. 0.500 to 0.600 inch, typical
14. 0.700 to 0.720 inch, typical
15. 0.450 to 0.510 inch, typical
16. PN MS9319-098, rivet, as required through stiffener, skin and patch plate. Locate manufactured head on near side.
17. PN MS9319-101, rivet, two per stiffener required through stiffener, flange, and patch plate. Use existing stiffener rivet holes and locate manufactured head on near side.
18. 0.050 inch maximum
19. 0.140 inch, typical
20. Patch plate, locally fabricated per text from AMS 4911 titanium alloy (0.015 to 0.018 inch thick). Patch plate shall conform to contour of support assembly.
21. Cover plate (reference)
22. PN AN123339, rivet, two required. Remove these rivets before making repair. Reinstall with new rivets when repair is complete by riveting through existing holes. Locate manufactured head on near side
23. 0.415 to 0.615 inch, to existing guide track rivet hole
24. 0.971 to 1.031 inch, to existing guide track rivet hole
25. PN MS9319-100, rivet, three required through flange and patch plate only. Locate manufactured head on near side.
26. 0.050 inch maximum
27. 0.050 inch maximum, all around contour
28. Coat patch plate and mating surface with adhesive sealant per text.

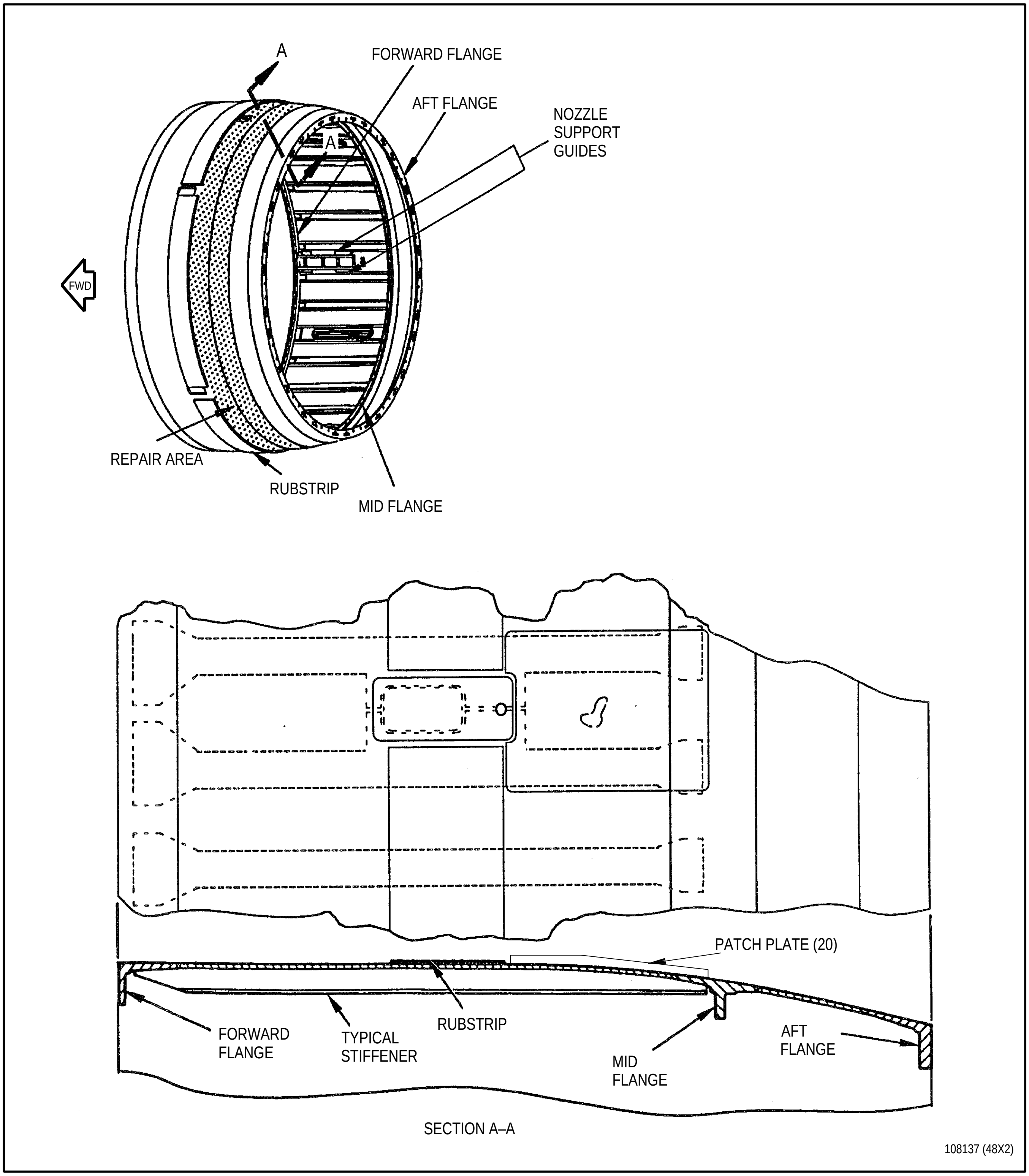


Figure 21. Augmentor Nozzle Support Assembly - Repair of Damage Around Nozzle Support Guides Between Rubstrip and Mid Flange - Method II (Sheet 1 of 2)

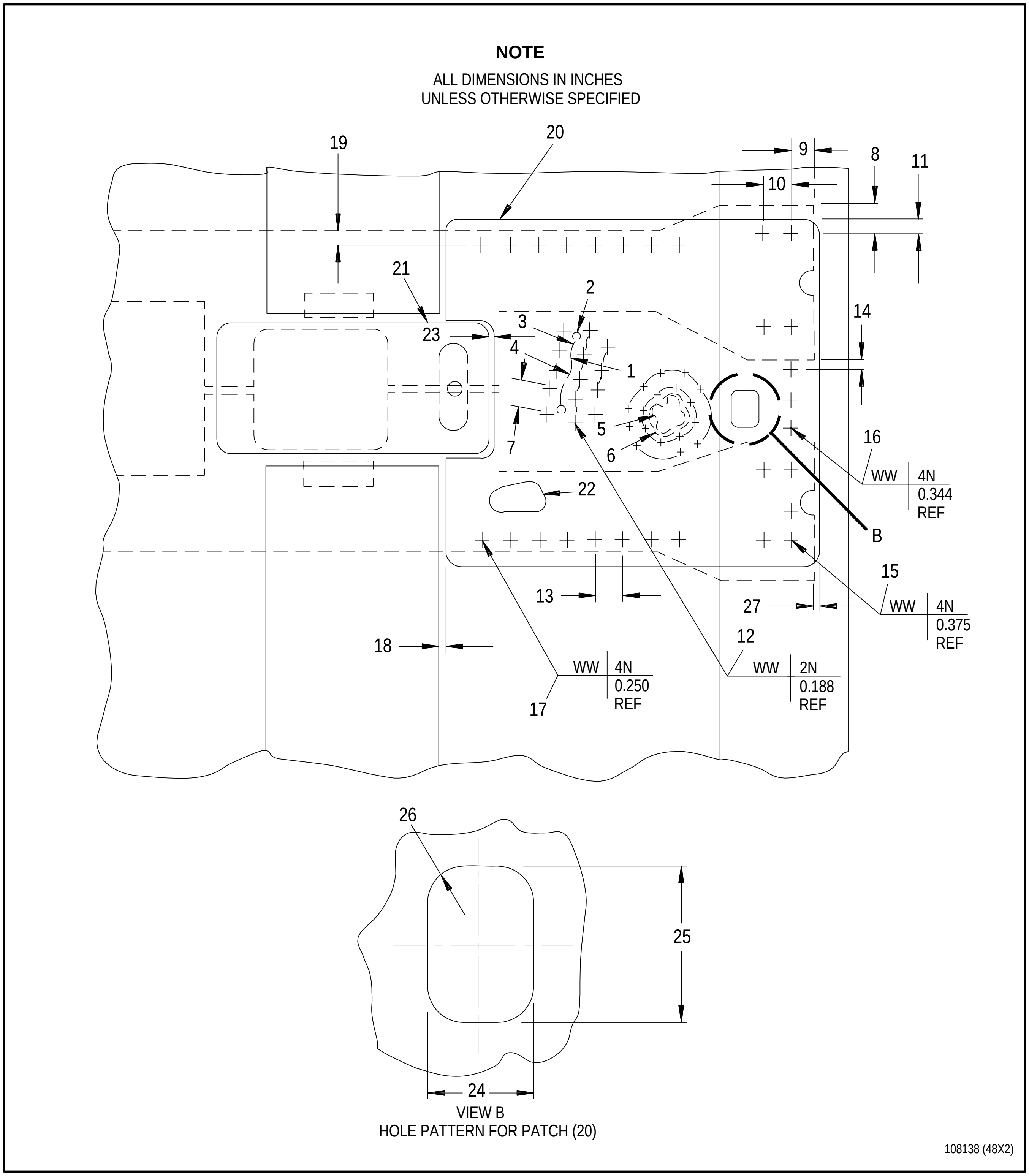


Figure 21. Augmentor Nozzle Support Assembly - Repair of Damage Around Nozzle Support Guides Between Rubstrip and Mid Flange - Method II (Sheet 2 of 2)

Legend for figure 21

1. Typical skin crack damage
2. Stop drill 0.120 to 0.130 inch diameter, as required.
3. 0.160 inch, typical from edge of crack or cut out
4. 0.400 to 0.500 inch, typical from closest edge of crack.
5. Typical damage
6. Cut out damaged area. Remove minimum amount of material 0.050 inch radius minimum.
7. 0.375 to 0.500 inch, typical
8. 0.520 inch, typical, to existing stiffener rivet holes
9. 0.280 inch, typical, to existing stiffener rivet holes
10. 0.500 inch, typical, between existing stiffener rivet holes
11. 0.280 inch, minimum, all sides
12. PN MS9319-004, rivet, as required through skin and patch plate only. Rivets shall be staggered between adjacent rows and spaced as shown. Locate manufactured head on near side.
13. 0.500 to 0.600 inch, typical
14. 0.280 inch, minimum, typical
15. PN MS9319-102, rivet, four per stiffener required through stiffener, flange, and patch plate. Use existing rivet holes and locate manufactured head on near side.
16. PN MS9319-101, rivet, as required through flange, and patch plate only. Locate manufactured head on near side.
17. PN MS9319-098, rivet, as required through stiffener, skin and patch plate. Locate manufactured head on near side.
18. 0.050 inch maximum
19. 0.140 inch, typical
20. Patch plate, locally fabricated per text from AMS 4911 titanium alloy (0.015 to 0.018 inch thick). Patch plate shall conform to contour of support assembly.
21. Cover plate (reference)
22. Coat patch plate and mating surface with adhesive sealant per text.
23. 0.050 inch, maximum, all around contour
24. 0.270 to 0.280 inch
25. 0.435 to 0.455 inch
26. 0.109 to 0.141 inch modified radius, 4 places
27. 0.050 inch maximum gap

22. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPAIR OF STIFFENER DAMAGE UNDERLYING RUBSTRIP.

(See Figure 22.)

NOTE

Stiffeners supporting guide tracks are not reparable per this paragraph.

a. Perform repair as follows: (See Figure 22.)

(1) Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for this procedure.

(2) Stop drill crack ends using 0.120 to 0.130 inch diameter drill.

(3) Deburr all holes.

(4) Fluorescent penetrant inspect(FPI) per SPOP 70 to make sure cracks have been properly stop drilled. Refer to T.O. 2-1-111.

CAUTION

- Cutting into support skin when removing rubstrip will cause hardware damage.
- Overheating of titanium will degrade material properties and may cause structural failure.

NOTE

It is recommended that repair patches for adjacent distress areas be combined into single patch.

(5) Remove section of rubstrip overlying damage and trim as shown in figure 22. Do not cut into support skin and do not allow titanium to become hot beyond touch during grinding. No discoloration from grinding allowed. Refer to T.O. 2-1-111. Maximum patch size should not exceed 200 square inches OD. Total area repaired for each support should not exceed 850 square inches OD.

CAUTION

Grit blasting to remove remaining rubber can severely damage the part.

(6) Remove any remaining silicon rubber from area under removed rubstrip. Use only nonmetallic scraper or nylon brush. Do not attempt to grit blast to remove remaining rubber.

NOTE

- Patch plate and shims can be locally fabricated using AMS 4911 titanium alloy. Fabricated patch shall conform to contour of support.
- AMS 4916 (commercially-pure titanium) may be used as alternate material for patches.

(7) Establish size of doubler(5), shims(9), and patch plate(24), based on dimensional requirements of figure 22. Patch plate and shims shall be locally fabricated using AMS 4911 titanium alloy. Fabricated patch shall conform to contour of support. If doubler size requires covering drain holes(8, figure 22), drill a 0.250 to 0.280 inch hole through each side of doubler per requirements of figure 22, Section D-D.

(8) Deburr all holes.

(9) Fit doubler(5) over existing stiffener as shown and measure gap(25).

(10) Select proper thickness of shim(27) to fill gap. Install shim while maintaining dimension(26). Remaining clearance of gap(25) shall not exceed 0.010 inch after shim(27) is installed.

NOTE

- High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.
- Minimum spacing between countersunk rivets shall be as specified. Rivets(6) located beneath dimension(16) will be countersunk.

(11) Clamp doubler and shims in position and drill holes for rivets per figure 22 in doubler, shims, stiffener, and support. Minimum spacing between countersunk rivets shall be 0.340 inch. Refer to T.O. 2-1-111.

(12) Position patch plate(20) on exterior of nozzle support and line drill rivet holes through plate. Line drill through holes created in previous step. Refer to T.O. 2-1-111.

(13) Countersink and dimple holes(6) which are located beneath dimension(16) on patch. Countersink from outside support through skin, damaged stiffener, shim and doubler. Refer to T.O. 2-1-111.

(14) Deburr all rivet holes.

(15) Prepare patch plate and mating surface for riveting as follows:

(a) Lightly hand polish contacting surfaces of support and patch plate with No. 240 silicon carbide abrasive paper.

(b) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(c) Apply PWA 556 primer per paragraph 12 and T.O. 2-1-111.

(d) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

1 PWA 36047 (DC93-076) per paragraph 12.

2 PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

CAUTION

Failure to install shims will result in hardware damage during rivet installation.

(16) Clamp patch in position and install rivets immediately after applying adhesive. Refer to T.O. 2-1-111. Maximum gap (sheet separation) between rivets shall not exceed 0.050 inch.

(17) Clean excess sealant using PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

PWA 617 or PWA 36003-1 adhesives require moisture to cure completely. Optimum curing conditions are 50% relative humidity at 75°F or equivalent moisture level.

(18) Cure assembly at room temperature for 24 hours before handling.

(19) Apply antigalling compound to entire rubstrip per paragraph 7.

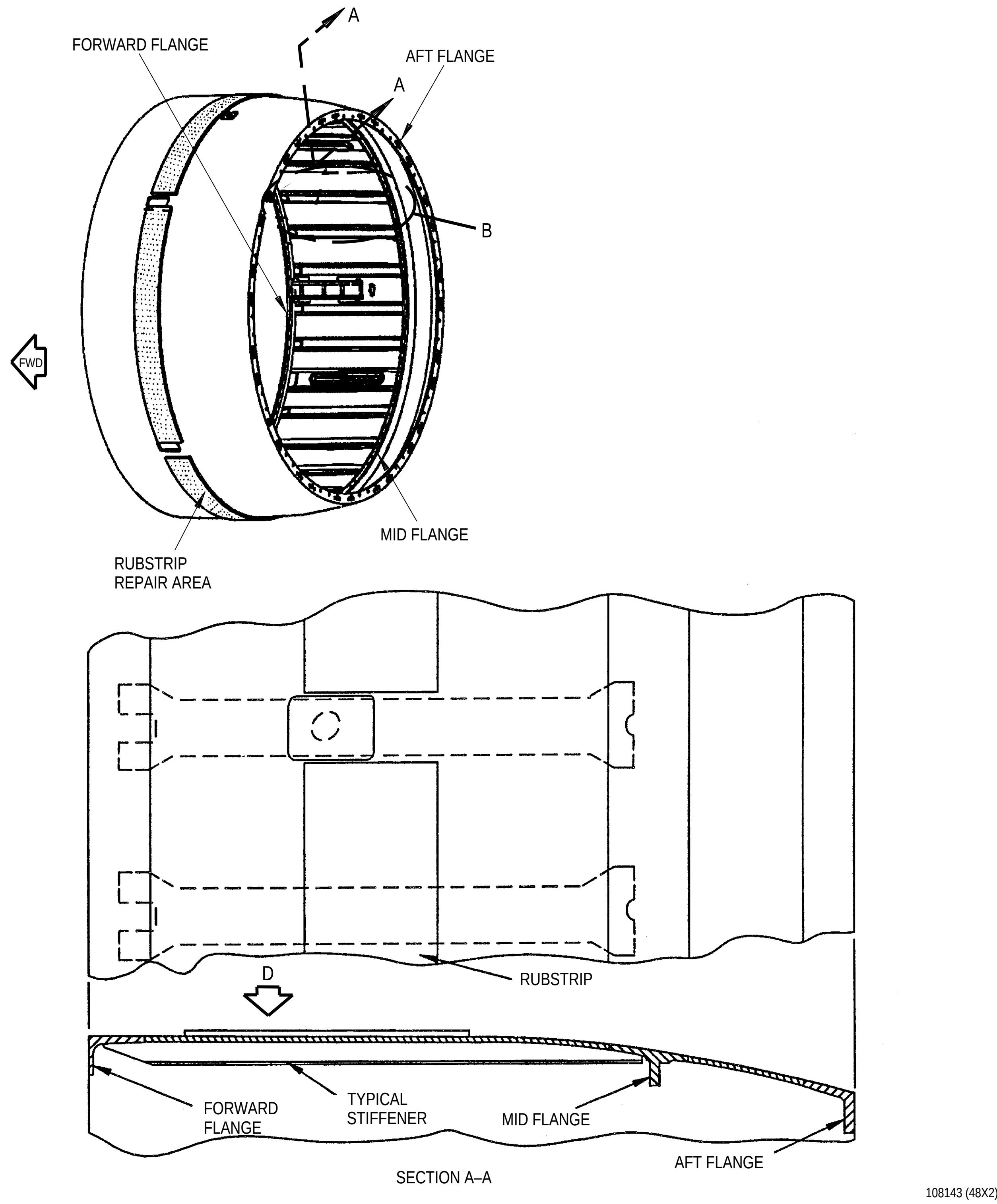


Figure 22. Augmentor Nozzle Support Assembly - Repair of Stiffener Damage Underlying Rubstrip (Sheet 1 of 4)

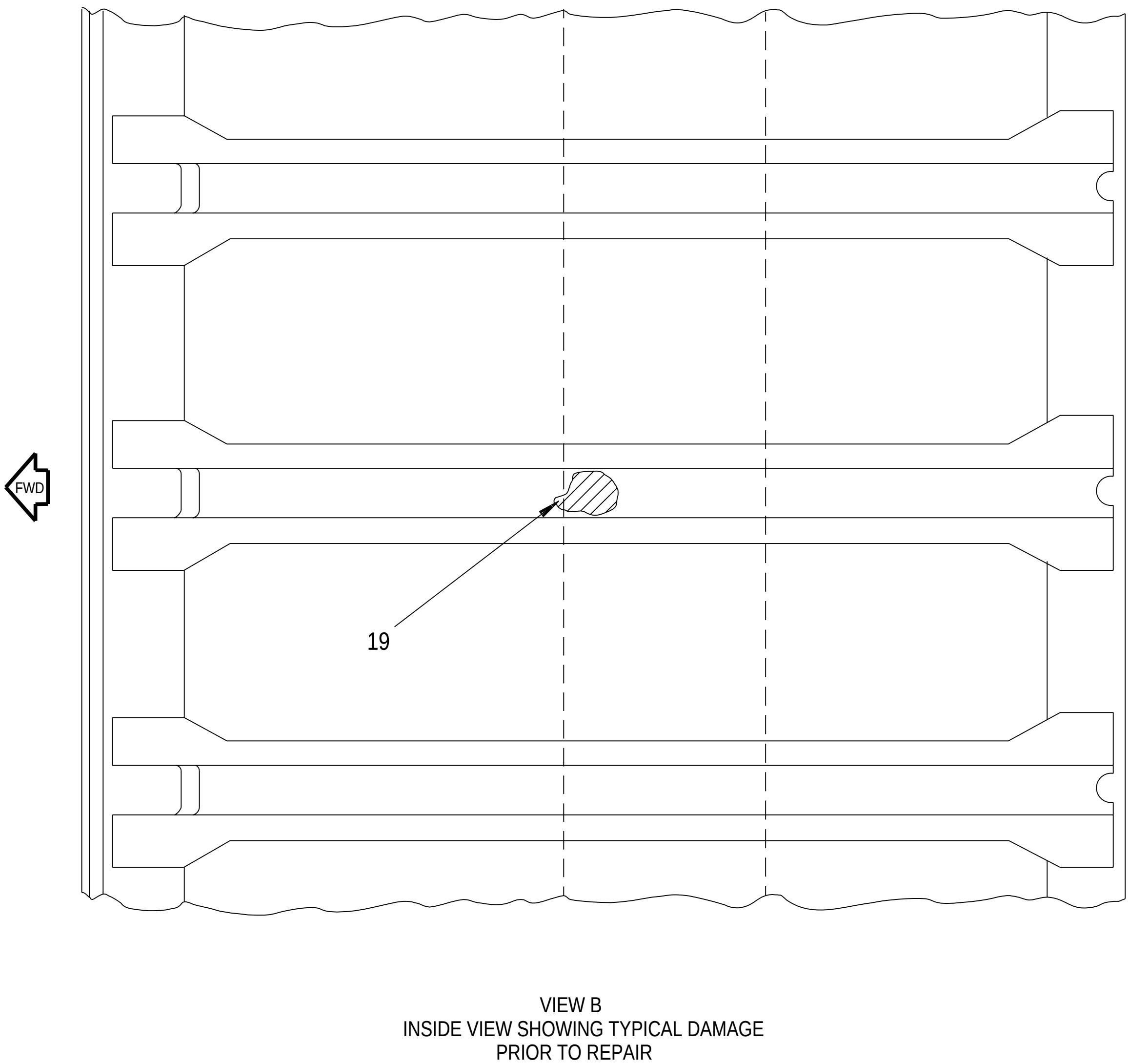


Figure 22. Augmentor Nozzle Support Assembly - Repair of Stiffener Damage Underlying Rubstrip (Sheet 2 of 4)

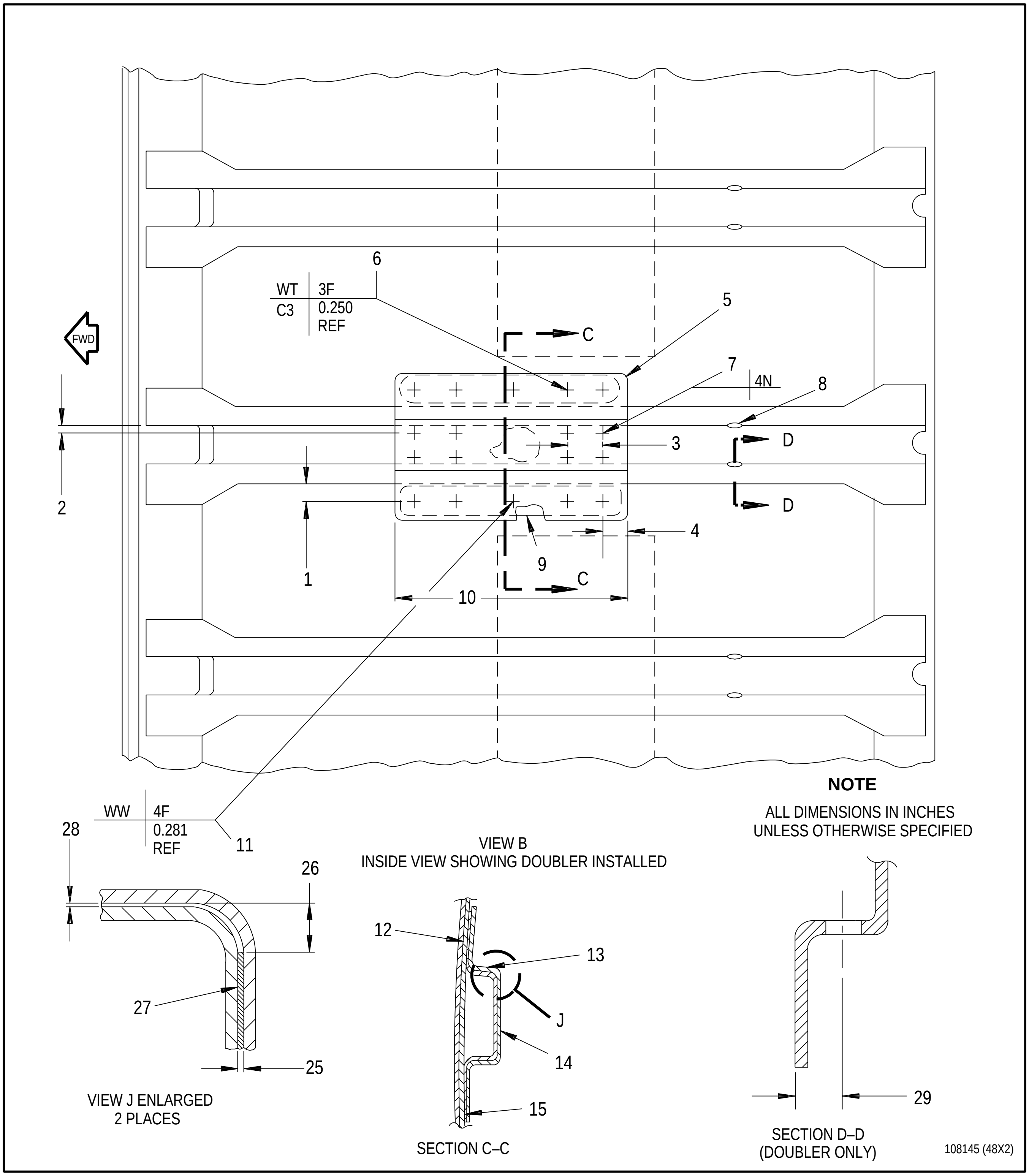


Figure 22. Augmentor Nozzle Support Assembly - Repair of Stiffener Damage Underlying Rubstrip (Sheet 3 of 4)

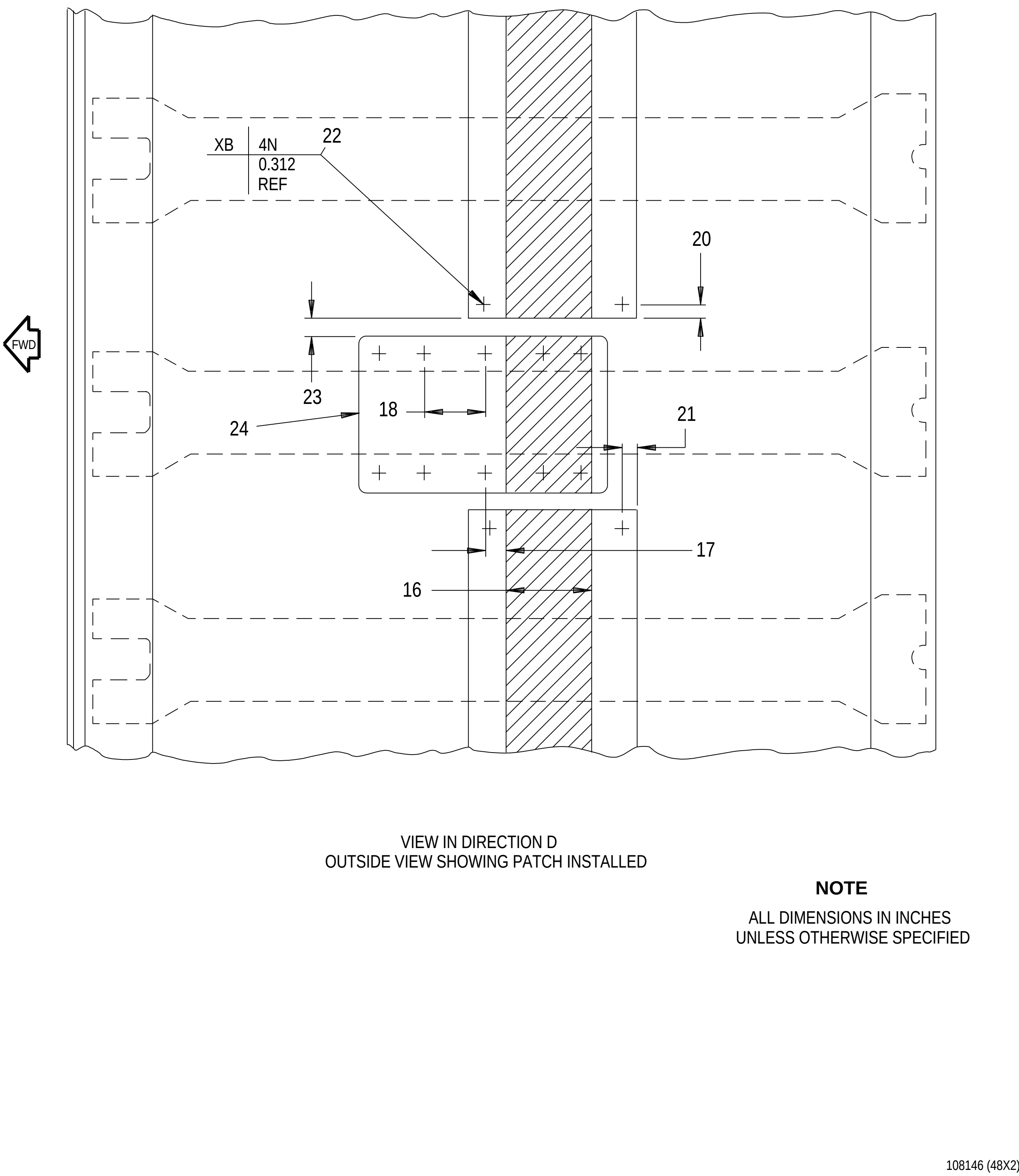


Figure 22. Augmentor Nozzle Support Assembly - Repair of Stiffener Damage Underlying Rubstrip (Sheet 4 of 4)

Legend for figure 22

1. 0.150 inch, typical, both sides
2. 0.200 inch, typical
3. 0.500 to 0.600 inch, typical. Adjust as necessary to accomodate damage.
4. 0.280 inch, minimum both ends
5. PN 4055310, doubler, cut to size as required
6. PN MS9318-052, rivet, as required through doubler shim, skin, and patch. Applies to all rivets which will be beneath dimension(16) on rubstrip patch. Locate manufactured head on far side.
7. PN 2152845, NAS9307M-4-01, or ST1173-01, rivet, as required through stiffener and doubler only. If a larger grip length rivet is required, use PN NAS9307M-4-02, ST1173-02, NAS9307M-4-03, or ST1173-03. Locate manufactured head on near side.
8. Drain holes (reference)
9. Shim, locally fabricated per text from AMS 4911 titanium alloy (0.019 to 0.028 inch, typical). Select thickness equivalent to adjacent stiffener.
10. 4.200 to 4.300 inch, centered over damage in stiffener
11. PN MS9319-099, rivet, through doubler, shim, skin, and patch. Locate manufactured head on far side.
12. No gap between shim and stiffener allowed.
13. Gap, equal, both sides, 0.055 inch maximum, reference
14. 0.010 inch maximum gap permissible between these surfaces, after shims installed, before riveting
15. 0.010 inch maximum gap permissible between shim and doubler, after shims installed, before riveting
16. 1.650 inches, centered relative to existing rubstrip
17. 0.140 inch, minimum
18. 0.500 to 0.600 inch, typical
19. Damage, typical, prior to repair
20. 0.280 minimum, both sides, typical
21. 0.385 to 0.435 inch, both sides, typical
22. PN AN12336, rivet, through rubstrip and skin. Locate manufactured head on near side
23. 0.000 to 0.010 inch, both ends
24. Patch plate, locally fabricated per text from AMS 4911 titanium alloy, 0.015 to 0.018 inch thick
25. Gap, 0.010 inch maximum after shims installed
26. 0.125 to 0.150 inch, 2 places
27. Shim material, AMS 4911 titanium alloy, 0.015 through 0.070 inch thick as required
28. Gap, equal both sides (0.070 inch maximum, reference)
29. 0.170 to 0.230 inch, 2 places per doubler

23. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPAIR OF ONE LINE CRACKS INTO OR THROUGH STIFFENER WELD AND STIFFENER MATERIAL, AND ONE LINE EDGE CRACKS NOT INTO OR THROUGH STIFFENER WELD.
(See Figures 23, 24 and 25.)

a. Three methods are available for repair of one line cracks into or through PN 4071156 stiffener and weld.

(1) Method I applies to one line cracks into or through stiffener resistance welds and stiffener material between rubstrip and forward flange. (See Figure 23.)

(2) Method II applies to one line cracks into or through stiffener resistance welds and stiffener material between mid flange and rubstrip. (See Figure 24.)

NOTE

Cracks exceeding restrictions in Method III can be repaired by Methods I or II.

(3) Method III applies to one line cracks not through stiffener resistance weld into flange radius. This repair carries these restrictions:

(a) Two cracks maximum per area, front or rear.

(b) Cracks shall be a minimum of 2.00 inches apart if they are on same side of stiffener.

(c) Cracks may be on both sides of stiffener if they are not directly opposite within 1.00 inch.

NOTE

Panels are defined as those areas lying between internal stiffeners as viewed from inside support.

NOTE

Stiffeners adjacent to panels containing an actuator access hole are not reparable per Method I.

NOTE

The following stiffeners are not reparable per this paragraph:

- Cam follower bearing track stiffeners.
- Stiffener with drain part if crack extends into port wall. If damage does not extend into port wall, stiffener is reparable by Method II only. Patch would be shortened from that shown in figure 24 with dimension(15) measured from port features.

b. Perform Method I and II as follows: (See figures 23 or 24.)

(1) Remove existing stiffener rivets. Discard rivets.

(2) Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

(3) If crack does not extend beyond row of rivets(37), remove bubble in patch and associated rivets. Patch edge should be straight line parallel to the doubler flange.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

(4) Stop drill ends of crack using 0.120 to 0.130 inch diameter drill.

(5) Deburr all holes.

(6) Fluorescent penetrant inspect(FPI) per SPOP 70 to make sure cracks have been properly stop drilled. Refer to T.O. 2-1-111.

NOTE

It is recommended that repair patches for adjacent distress areas be combined into single patch.

(7) Lay out rivet pattern adjacent to crack on inside of support per figure 23 or 24. Maximum patch size should not exceed 200 square inches OD. Total area repaired for each support should not exceed 850 square inches OD.

NOTE

- AMS 4916 (commercially-pure titanium) may be used as alternate material for patches.
- It is permissible to fabricate patch plate and shims using AMS 4911 titanium alloy. Fabricated patch shall conform to contour of support.

(8) Establish size of patch plate(14), doubler(17), and shim(27), based on rivet pattern requirements of step c.(6). Patch plate and shims shall be locally fabricated using AMS 4911 titanium alloy. Fabricated patch shall conform to contour of support.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

(a) Use Method II for the following:

1 If doubler(17) size requires covering drain holes(30), drill a 0.250 to 0.280 inch diameter hole through each side of doubler per requirements of figure 24, Section C-C.

(b) Deburr all holes in doubler.

(9) Deburr doubler after cutting to size.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

(10) Clamp doubler and shims in position and drill rivet holes per figures 23 and 24. For rivets(31, figure 23) and (33, figure 24) line drill the holes through the existing stiffener rivet holes. Refer to T.O. 2-1-111.

(11) Position patch plate(14) on exterior of nozzle support and line drill rivet holes through plate. Line drill through holes created in previous step. Refer to T.O. 2-1-111.

(12) Deburr all rivet holes.

(13) Prepare patch plate and mating surface as follows:

(a) Lightly hand polish contacting surfaces of support and patch plate with No. 240 silicon carbide abrasive paper.

(b) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(c) Apply PWA 556 primer per paragraph 12. Refer to T.O. 2-1-111.

(d) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

1 PWA 36047 (DC93-076) per paragraph 12.

2 PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

CAUTION

Failure to install shims will result in hardware damage during rivet installation.

(14) Clamp plate, doubler, and shims in position immediately after applying sealant and rivet as follows, except maximum gap (sheet separation) between rivets shall not exceed 0.050 inch. Refer to T.O. 2-1-111.

(a) Rivet through patch and forward or mid-flange first, starting from center of patch and working outward toward edge of patch.

(b) Install remaining rivets as required. Minimum edge distance waived.

(15) Clean excess sealant using PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

PWA 617 or PWA 36003-1 adhesives require moisture to cure completely. Optimum curing conditions are 50% relative humidity at 75°F or equivalent moisture level.

(16) Cure assembly at room temperature for 24 hours before handling.

NOTE

If using Method II, after assembly and cure, a 0.110 inch diameter rod shall pass freely through respective drain holes(30, figure 24).

c. Perform Method III as follows: (see Figure 25.)

(1) Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for use in this procedure.

(2) Stop drill ends of crack using 0.096 to 0.100 inch diameter drill.

(3) Deburr all holes.

(4) Rivet through stop drilled holes. Refer to T.O. 2-1-111. Minimum edge distance waived.

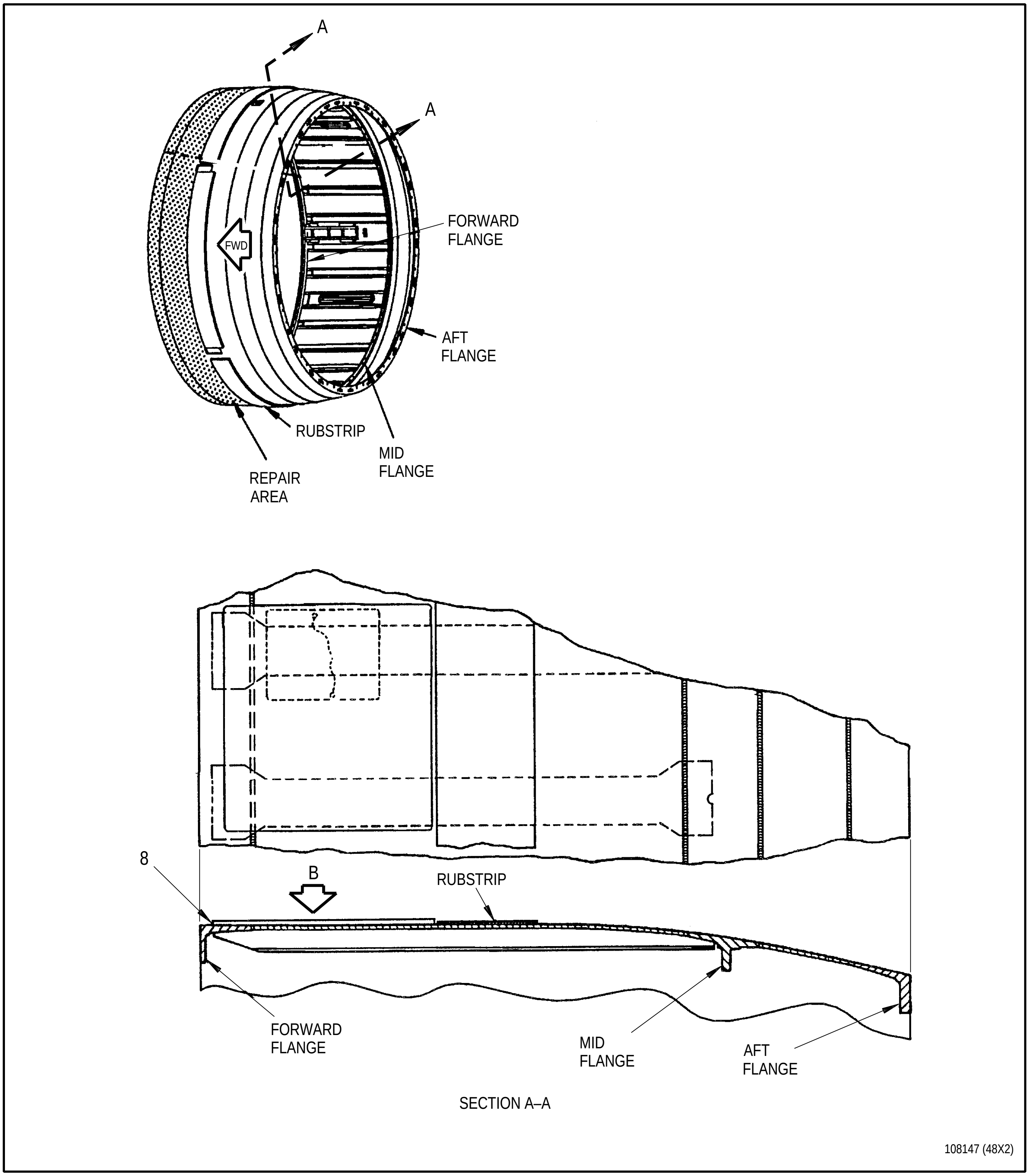


Figure 23. Augmentor Nozzle Support Assembly - Repair of One-Line Skin Cracks Into or Through Stiffener Weld and Stiffener Material Between Rubstrip and Forward Flange - Method I (Sheet 1 of 3)

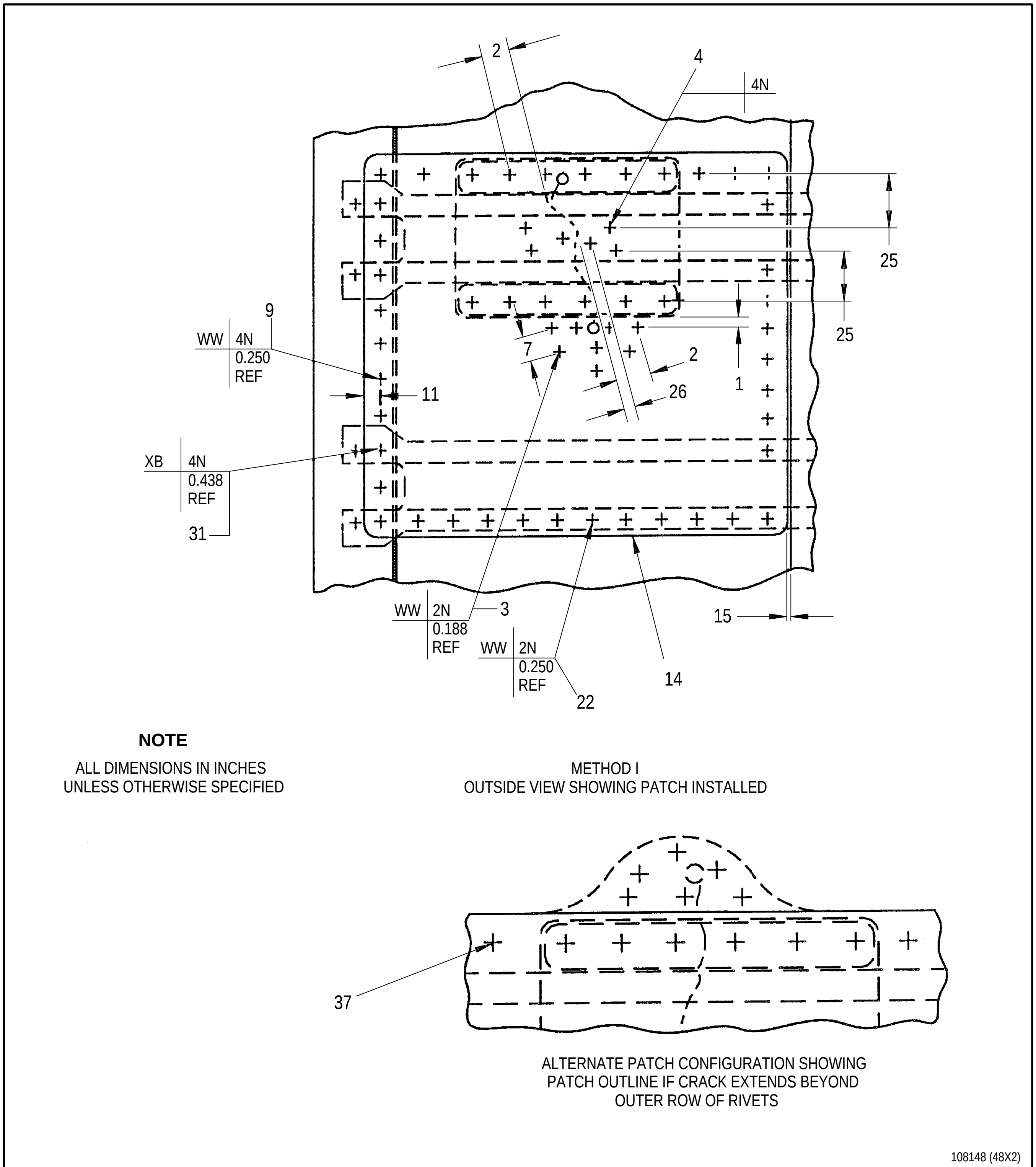


Figure 23. Augmentor Nozzle Support Assembly - Repair of One-Line Skin Cracks Into or Through Stiffener Weld and Stiffener Material Between Rubstrip and Forward Flange - Method I (Sheet 2 of 3)

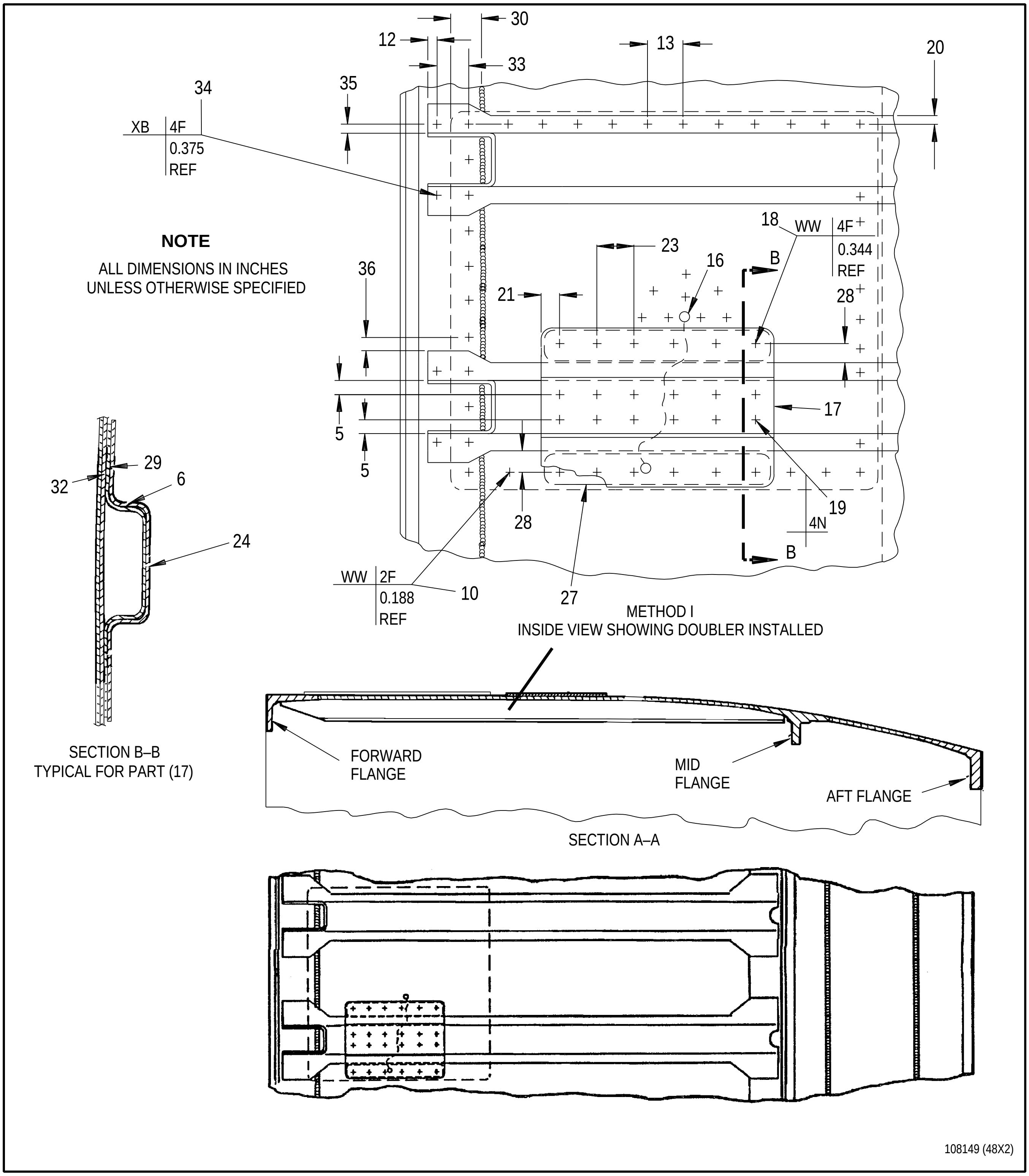


Figure 23. Augmentor Nozzle Support Assembly - Repair of One-Line Skin Cracks Into or Through Stiffener Weld and Stiffener Material Between Rubstrip and Forward Flange - Method I (Sheet 3 of 3)

Legend for figure 23

1. 0.130 to 0.290 inch, both sides
2. 0.400 to 0.500 inch. Locate from closest edge of crack
3. PN MS9319-004, rivet, as required spaced around both ends of crack as shown. Locate manufactured head on near side.
4. PN 2152845, NAS9307M-4-01, or ST1173-01, rivet, six required through patch plate and skin only. Shall be staggered relative to rivets(19). If a larger grip rivet is required, use PN NAS9307M-4-02, ST1173-02, NAS9307M-4-03, or ST1173-03. Locate manufactured head on near side.
5. 0.200 inch, typical
6. Gap, equal both sides (0.050 inch maximum, reference)
7. 0.375 to 0.500 inch, typical
8. Coat patch and mating surface with adhesive sealant per text.
9. PN MS9319-098, rivet, as required through patch plate and flange only. Locate manufactured head on near side.
10. PN MS9319-004, rivet, as required through patch plate and skin only, fore and/or aft of doubler. Locate manufactured head on far side.
11. 0.280 inch, minimum, typical, to edge of patch, all sides
12. 0.280 inch, typical, to existing stiffener rivet hole
13. 0.500 to 0.600 inch, typical, all sides unless otherwise specified
14. Patch plate, locally fabricated per text from AMS 4911 titanium alloy (0.015 to 0.018 inch thick).
15. 0.050 inch maximum
16. Stop drill 0.120 to 0.130 inch diameter, 2 places per text.
17. PN 4083132, doubler, cut to size required
18. PN MS9319-101, rivet, as required through patch plate, skin, shim, and doubler, five minimum each side of doubler, two minimum front and rear of crack as shown. Locate manufactured head on far side.
19. PN 2152845, NAS9307M-4-01, or ST1173-01, rivet, ten minimum required through stiffener and doubler only. If a larger grip rivet is required,use PN NAS9307M-4-02, ST1173-02, NAS9307M-4-03, or ST1173-03. Locate manufactured head on near side.
20. 0.140 inch, typical, from edge of stiffener
21. 0.280 inch, minimum, to edge of doubler, both sides
22. PN MS9319-006, rivet, as required, through patch plate, skin, and stiffener. Locate manufactured head on near side.
23. 0.500 to 0.600 inch, typical, both sides of doubler
24. 0.010 inch maximum gap permissible between these surfaces before riveting. Gap exceeding this amount shall be reduced using a shim locally fabricated from AMS 4911 titanium alloy, thickness as required (0.015 to 0.070 inch typical).
25. 0.700 inch, typical
26. 0.160 inch, typical. Shall be staggered relative to rivets(19).

Legend for figure 23 (Continued)

27. Shim, locally fabricated per text from AMS 4911 titanium alloy (0.019 to 0.028 inch typical). Select thickness equivalent to adjacent stiffener.
28. 0.150 inch, typical
29. 0.010 inch maximum radial gap permissible between shim and doubler after shims installed, before riveting, both sides
30. 0.400 to 0.600 inch from centerline of circumferential weld
31. PN AN123338, rivet, four required through patch plate, flange, and stiffener. Locate manufactured head on near side.
32. No gap between shim and stiffener allowed.
33. 0.400 inch, typical between existing stiffener rivet holes
34. PN AN123337, rivet, four required through stiffener and flange only. Locate manufactured head on far side.
35. 0.280 inch, typical to existing stiffener rivet hole
36. 0.280 inch, minimum, typical
37. Eliminate the "bubble" in patch and associated rivets if crack does not extend beyond this row of rivets. Patch edge should be straight line parallel to the doubler flange.

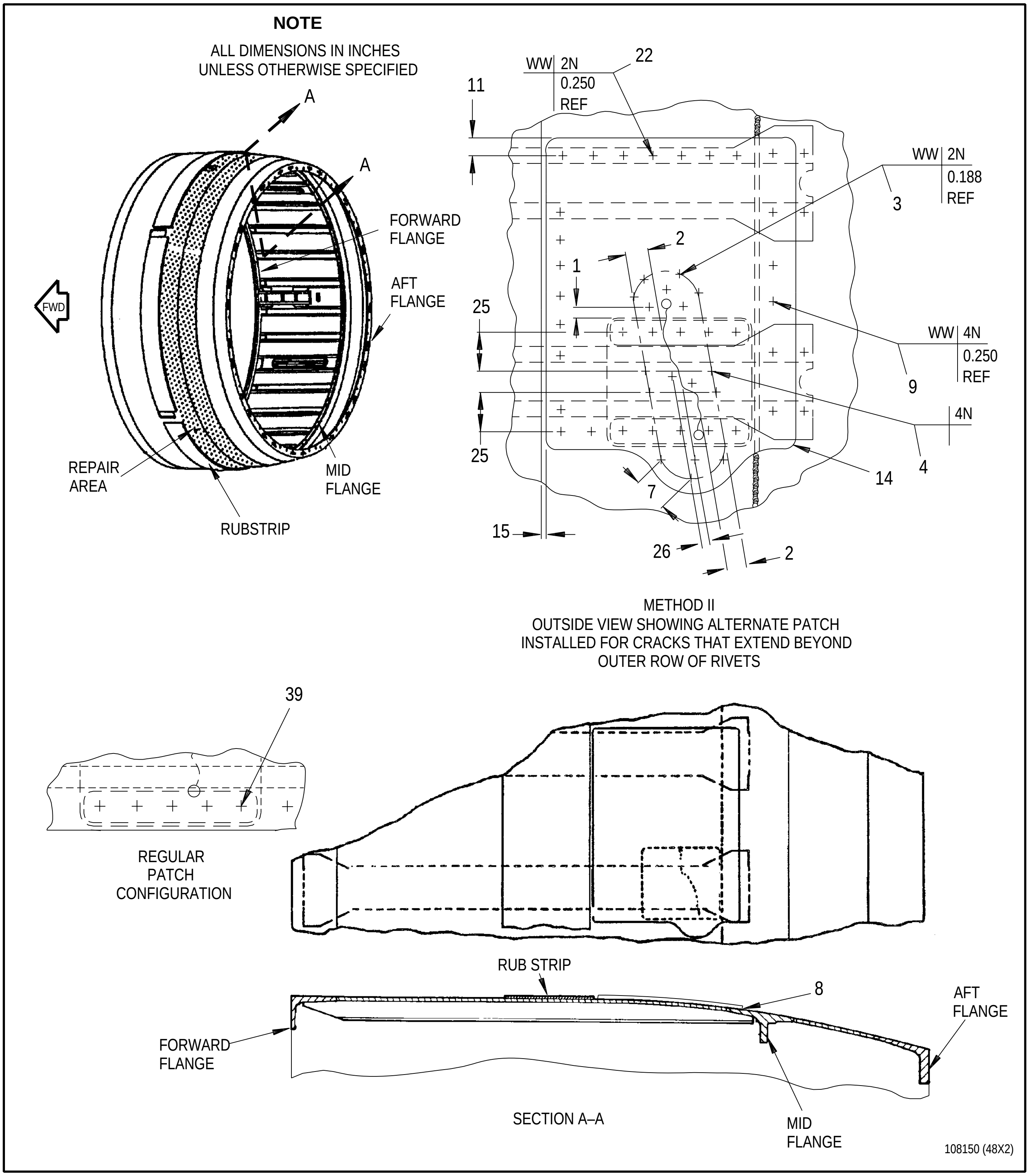


Figure 24. Augmentor Nozzle Support Assembly - Repair of One-Line Skin Cracks Into or Through Stiffener Weld and Stiffener Material Between Rubstrip and Mid-Flange - Method II (Sheet 1 of 2)

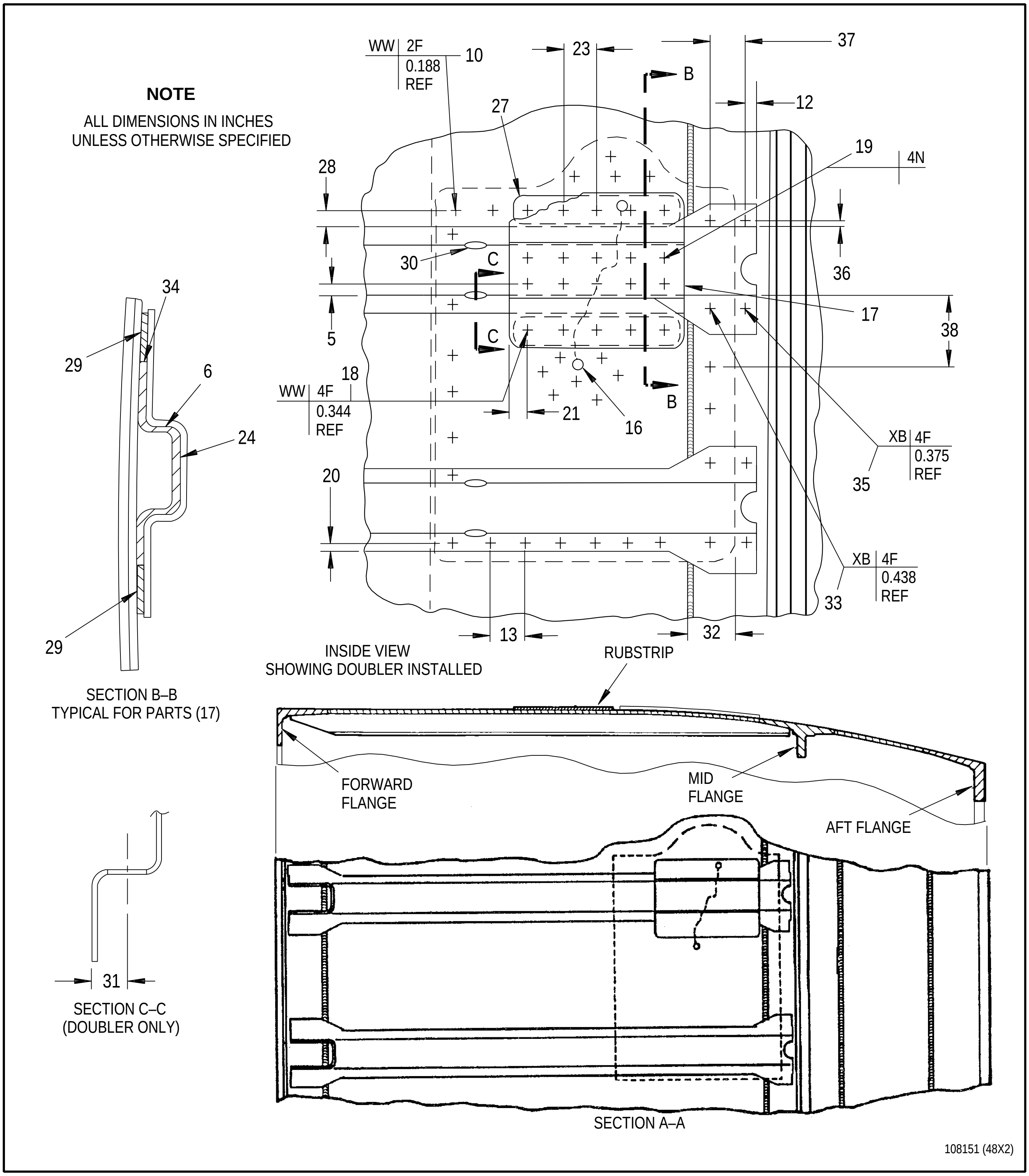


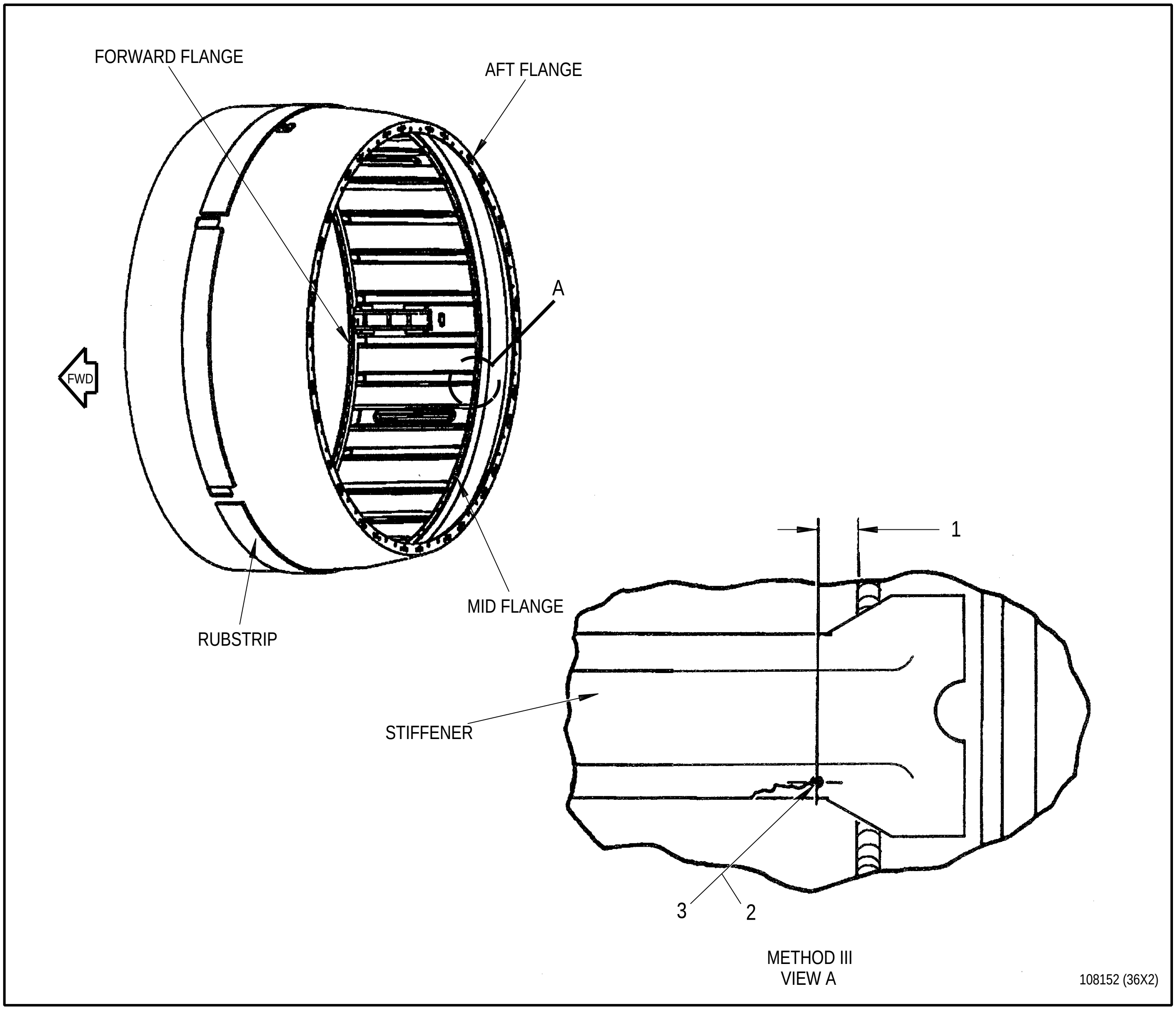
Figure 24. Augmentor Nozzle Support Assembly - Repair of One-Line Skin Cracks Into or Through Stiffener Weld and Stiffener Material Between Rubstrip and Mid-Flange - Method II (Sheet 2 of 2)

Legend for figure 24

1. 0.130 to 0.290 inch, both sides
2. 0.400 to 0.500 inch. Locate from closest edge of crack.
3. PN MS9319-004, rivet, as required, spaced around both ends of crack as shown. Locate manufactured head on near side.
4. PN 2152845, NAS9307M-4-01, or ST1173-01, rivet, six required through patch plate and skin only. Shall be staggered relative to rivets(19). If a larger grip rivet is required, use PN NAS9307M-4-02, ST1173-02, NAS9307M-4-03, or ST1173-03. Locate manufactured head on near side.
5. 0.200 inch, typical, both sides
6. Gap, equal both sides (0.060 inch maximum, reference)
7. 0.375 to 0.500 inch
8. Coat patch and mating surface with adhesive sealant per text.
9. PN MS9319-098, rivet, as required, through patch plate and flange only. Locate manufactured head on far side.
10. PN MS9319-004, rivet, as required, through patch plate and skin only, fore and/or aft of doubler. Locate manufactured head on far side.
11. 0.280 inch, minimum, to edge of patch, all sides
12. 0.280 inch, typical, to existing stiffener rivet holes
13. 0.500 to 0.600 inch, typical, all sides unless otherwise specified
14. Patch plate, locally fabricated per text from AMS 4911 titanium alloy (0.015 to 0.018 inch thick).
15. 0.050 inch maximum. On stiffeners with drain ports, patch would be shortened from that shown with this dimension measured from port features.
16. Stop drill 0.120 to 0.130 inch diameter, 2 places per text.
17. PN 4083135 or 4055310, doubler, cut to size required
18. PN MS9319-101, rivet, as required, through patch plate, skin, shim, and doubler, five minimum each side of doubler, two minimum front and rear of crack as shown. Locate manufactured head on far side.
19. PN 2152845, NAS9307M-4-01, or ST1173-01, rivet, ten minimum, required through stiffener and doubler only. If a larger grip rivet is required,use PN NAS9307M-4-02, ST1173-02, NAS9307M-4-03, or ST1173-03. Locate manufactured head on near side.
20. 0.140 inch, typical, from edge of stiffener
21. 0.280 inch, minimum, to edge of doubler, both sides
22. PN MS9319-006, rivet, as required, through patch plate, skin, and stiffener. Locate manufactured head on near side.
23. 0.500 to 0.600 inch, typical, both sides of doubler
24. 0.010 inch maximum gap permissible between these surfaces before riveting. Gap exceeding this amount shall be reduced using a shim locally fabricated from AMS 4911 titanium alloy, thickness as required (0.015 to 0.070 inch typical).
25. 0.700 inch, typical
26. 0.160 inch, typical. Shall be staggered relative to rivets(19).

Legend for figure 24 (Continued)

27. Shim, locally fabricated per text from AMS 4911 titanium alloy (0.019 to 0.028 inch typical). Select thickness equivalent to adjacent stiffener.
28. 0.150 inch, typical, both sides of stiffener
29. 0.010 inch maximum radial gap permissible between shim and doubler after shims installed, before riveting, both sides
30. Drain holes, 2 places per stiffener
31. 0.170 to 0.230 inch, 2 places per doubler
32. 0.750 to 0.850 inch from centerline of existing circumferential weld
33. PN AN123338, rivet, four required through patch plate, flange, and stiffener. Locate manufactured head on far side.
34. No gap between shim and stiffener allowed.
35. PN AN123337, rivet, four required through flange and stiffener. Locate manufactured head on far side.
36. 0.270 inch, typical to existing stiffener rivet holes
37. 0.500 inch, typical between existing stiffener rivet holes
38. 1.070 to 1.080 inch, typical
39. Eliminate the "bubble" in patch and associated rivets if crack does not extend beyond this row of rivets. Patch edge should be straight line parallel to the doubler flange.



1. 0.280 inch minimum from circumferential weld
2. Stop drill 0.096 to 0.100 inch diameter
3. Rivet in stop drill hole using MS9319-052, rivet, as required. Locate manufactured head on far side.

Figure 25. Augmentor Nozzle Support Assembly - Repair of One-Line Stiffener Edge Cracks - Method III

24. AUGMENTOR NOZZLE SUPPORT ASSEMBLY - REPAIR OF MULTIPLE SKIN CRACKS INTO AND THROUGH STIFFENER LEG AND STIFFENER WELD.
(See Figures 26, 27, 28, and 29.)

a. The four methods available for repair of single and/or multiple cracks in and through augmentor nozzle support assembly axial stiffeners and stiffener welds are as follows:

(1) Method I applies to axial stiffeners between rubstrip and forward flange. (See Figure 26.)

(2) Method II applies to axial stiffeners at bottom dead center position between rubstrip and mid-flange where augmentor nozzle support drain boss is located. (See Figure 27.)

(3) Method III applies to axial stiffeners which are not cam follower stiffeners between rubstrip and mid-flange where cracks are into and through top flange of stiffeners and/or stiffener welds. (See Figure 28.)

(4) Method IV applies to axial stiffeners which are not cam follower stiffeners where cracks are limited to resistance welds which attach stiffeners to nozzle support assembly mid-flange. (See Figure 29.)

b. Methods II and III may require use of doublers and shims in addition to patch plate if skin crack has propagated into stiffener flange.

c. Perform Methods I, II, or III as follows: (See figures 26, 27, and 28.)

(1) Remove existing rivets from damaged stiffener. Discard rivets.

(2) Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

CAUTION

Stop drilling through a circumferential weld can cause severe damage to augmentor nozzle support.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for this procedure.

(3) Stop drill ends of cracks using a 0.120 to 0.130 inch diameter drill. Do not stop drill in circumferential welds.

(4) Deburr all holes.

(5) Fluorescent penetrant inspect(FPI) per SPOP 70 to make sure that cracks have been properly stop drilled. Refer to T.O. 2-1-111.

(6) For Method II, remove augmentor nozzle support boss by removing rivets. Refer to T.O. 2-1-111.

NOTE

It is recommended that repair patches for adjacent distress areas be combined into single patch.

(7) Lay out rivet pattern adjacent to crack on inside of support per figures 26, 27, and 28. Doublers and shims (Methods II and III) are required if skin crack has propagated into stiffener flange. Maximum patch size should not exceed 200 square inches OD. Total repaired area for each support should not exceed 850 square inches OD.

NOTE

- Patches can be locally fabricated using AMS 4911 titanium alloy. Fabricated patch shall conform to contour of support.
- AMS 4916 (commercially-pure titanium) may be used as alternate material for patches.

(8) Establish size of patch plate, doublers and shims (Methods II and III) as required, based on rivet pattern requirements of step c.(7). Patch plate shall be locally fabricated using AMS 4911 titanium alloy. Fabricated patch shall conform to contour of support.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for this procedure.

(9) Clamp doubler and shims (Method II and III) in position, and drill rivet holes as follows:

(a) For rivets(14), line drill holes through existing stiffener rivet holes (see figure 26). Refer to T.O. 2-1-111.

(b) For rivets(35, 36, and 44), line drill holes through existing stiffener rivet holes (see figure 27). Refer to T.O. 2-1-111.

(c) For rivets(20, 22, and 30), line drill holes through existing stiffener rivet holes (see figure 28). Refer to T.O. 2-1-111.

(10) Position patch plate(4, figure 26), (31, figure 27), and (18, figure 28) on exterior of nozzle support and line drill rivet holes through plate. Line drill through holes created in previous step. Refer to T.O. 2-1-111.

(11) Deburr all rivet holes.

(12) Prepare patch plate and support as follows:

(a) Lightly hand polish contacting surfaces of support and patch plate with No. 240 silicon carbide abrasive paper.

(b) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(c) Apply PWA 556 primer per paragraph 12. Refer to T.O. 2-1-111.

(d) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

1 PWA 36047 (DC93-076) per paragraph 12.

2 PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

CAUTION

Failure to install shims will result in hardware damage during rivet installation.

(13) Clamp plate, doublers, and shims (Methods II and III) in position immediately after applying sealant as required, and rivet, except maximum gap (sheet separation) between rivets shall not exceed 0.050 inch. Minimum edge distance waived. Refer to T.O. 2-1-111.

(14) Clean excess sealant using PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

PWA 617 or PWA 36003-1 adhesives require moisture to cure completely. Optimum curing conditions are 50% relative humidity at 75°F or equivalent moisture level.

(15) Cure assembly at room temperature for 24 hours before handling.

(16) If using Method II, install augmentor nozzle support drain boss by riveting per figure 27. Refer to T.O. 2-1-111.

d. Perform Method IV as follows: (See figure 29.)

(1) Remove aft end stiffener rivets from damaged stiffener. Discard rivets.

(2) Fluorescent penetrant inspect(FPI) per SPOP 70 to determine ends of cracks. Refer to T.O. 2-1-111.

CAUTION

Stop drilling through a circumferential weld can cause severe damage to augmentor nozzle support.

NOTE

High-speed cobalt or carbide-tipped drill bits are recommended for this procedure.

(3) Stop drill ends of cracks using a 0.120 to 0.130 inch diameter drill. Do not stop drill in circumferential welds.

(4) Deburr all holes.

(5) Fluorescent penetrant inspect(FPI) per SPOP 70 to make sure that cracks have been properly stop drilled. Refer to T.O. 2-1-111.

NOTE

It is recommended that repair patches for adjacent distress areas be combined into single patch.

(5a) Determine patch size to not exceed 200 square inches OD. Total repaired area for each support should not exceed 850 square inches OD.

(6) Blend circumferential weld(1) as required so shims(7) will lie flush when placed across weld. Doubler(2) shall lie flat when mounted on axial stiffener trailing edge.

(7) Position shims(7) on nozzle support as shown in figure 29.

(8) Fit doubler(2) over existing stiffener and measure gap(19).

(9) Select shim(22) thickness to fill gap and temporarily install shim. Gap with shim installed shall not exceed 0.010 inch maximum.

(10) Cut shims to final size. Make sure that dimensions(3) and (20) are maintained.

(11) Remove shims(7) and (22) and doubler(2).

(12) Determine location for the rivet holes, 0.128 to 0.132 inch diameter or, if preferred, pilot holes, 0.060 to 0.070 inch diameter, in doubler per dimensions(4, 5, 6, and 23).

(13) Drill or hand punch the rivet holes located in previous step.

(14) Deburr all rivet holes.

(15) Clamp doubler(2) to shims(7) per dimension(3). Use drill or hand punch to transfer hole pattern from doubler (prior step) to shims.

(16) Remove shims and repeat previous step with reinforcing plate(14).

(17) Locate doubler(2) and shims(7) on cracked stiffener per dimension(3).

(18) Use 0.128 to 0.132 inch diameter drill bit to transfer hole pattern, dimension(6), from shims(7), through nozzle support assembly. Clamp each hole drilled with temporary fastener. Existing stiffener rivet holes must be used to determine location of rivet holes through doubler and patch plate per dimensions(10), (11), and (12).

(19) Install shim(22) in position per dimension(20) and locate and drill holes for blind rivets(8). Use a 0.128 to 0.132 inch diameter drill bit at 6 locations per dimensions(4) and (9).

(20) Remove all temporary fasteners and deburr rivet holes on nozzle support assembly, doubler(2), patch plate(14), and shims(7) and (22).

(21) Deburr all holes.

(22) Prepare patch plate and mating surface as follows:

(a) Lightly hand polish contacting surfaces of support and patch plate with No. 240 silicon carbide abrasive paper.

(b) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

If RTV 159 per specification PWA 617 or PWA 36003-1 is used, priming may be omitted.

(c) Apply PWA 556 primer per paragraph 12. Refer to T.O. 2-1-111.

(d) Apply 0.010 to 0.020 inch thick uniform layer of one of the following adhesive sealants to patch plate and mating surface of support within two (2) hours after priming:

1 PWA 36047 (DC93-076) per paragraph 12.

2 PWA 617 or PWA 36003-1. Refer to T.O. 2-1-111.

CAUTION

Failure to install shims will result in hardware damage during rivet installation.

(23) Reinstall doubler(2), patch plate(14), shims(7) and (22) on nozzle support immediately after applying sealant assembly per dimension(3). Clamp with temporary fasteners.

NOTE

PN NAS9307M is preferred rivet.

(24) Measure thickness(18) of assembled patch at locations where blind rivets(8) will be installed. If thickness is equal to or less than 0.125 inch, use rivets with a part number length suffix of -02 on their part number. If thickness exceeds 0.125 inch, use rivets with a length suffix of -03 on their part number.

(25) Install rivets(8, 13, and 14) per T.O. 2-1-111. Maximum gap (sheet separation) between rivets shall not exceed 0.050 inch. Minimum edge distance waived unless otherwise specified.

(a) Install rivet(8) first, through top of doubler and stiffener.

(b) Install remaining rivets(13) and (14).

(26) Clean parts per PWA 83-B2. Refer to T.O. 2-1-111.

NOTE

PWA 617 or PWA 36003-1 adhesives require moisture to cure completely. Optimum curing conditions are 50% relative humidity at 75°F or equivalent moisture level.

(27) Cure assembly at room temperature for 24 hours before handling.

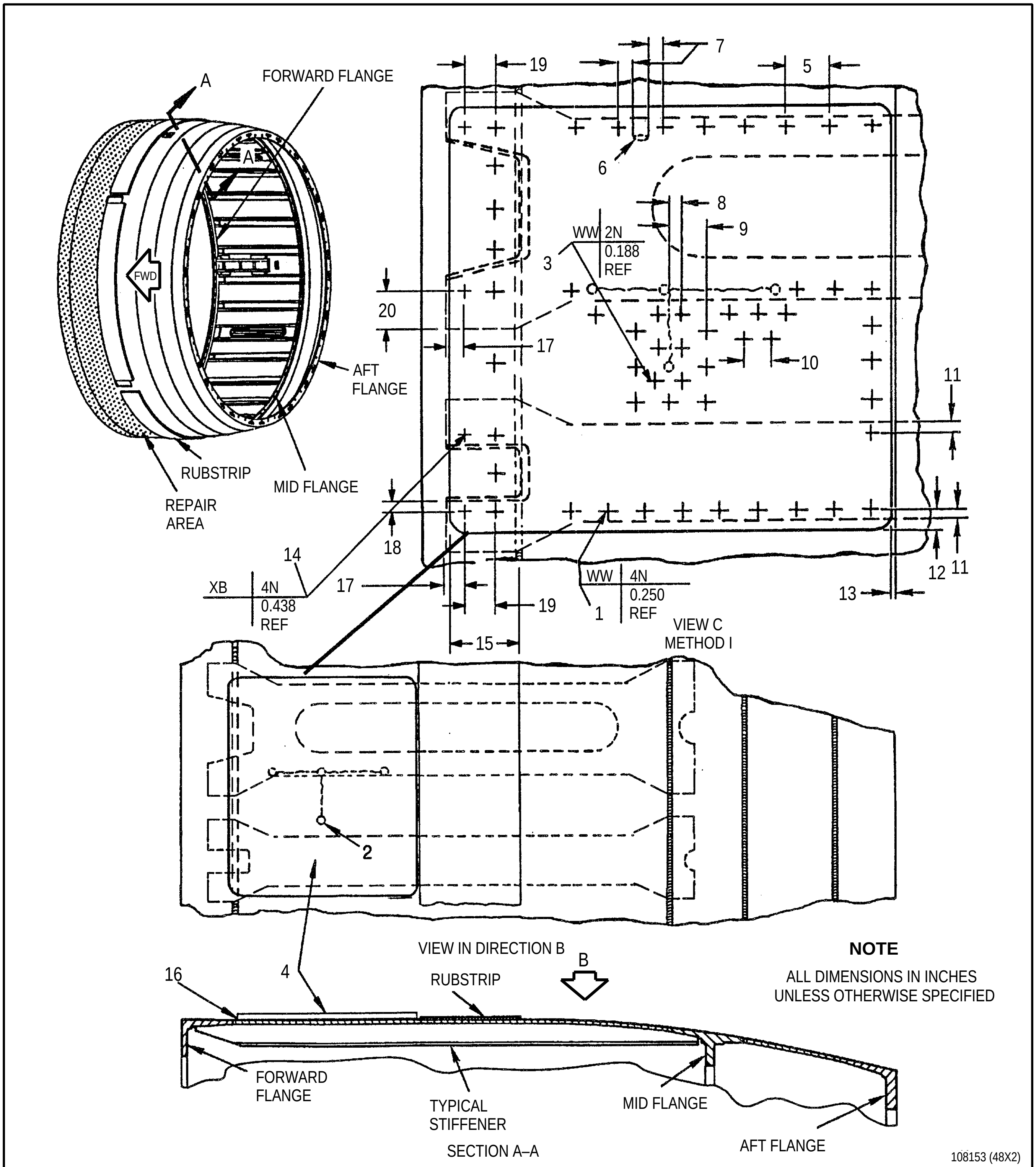


Figure 26. Augmentor Nozzle Support Assembly - Repair of Multiple Skin Cracks Into and Through Stiffener Weld Between Forward Flange and Rubstrip - Method I

Legend for figure 26

1. PN MS9319-098, rivet, as required through stiffener, skin and patch plate. Typical for 4 sides except on patch trailing edge between stiffeners. Locate manufactured head on near side.
2. Stop drilled hole, 0.120 to 0.130 inch diameter
3. PN MS9319-004, rivet, as required through skin and patch plate only spaced around crack as shown. Rivets shall be 0.130 to 0.290 inch from stiffener flange edge and/or circumferential weld line. Locate manufactured head on near side.
4. Patch plate, locally fabricated per text from AMS 4911 titanium alloy, 0.015 to 0.018 inch thick.
5. 0.500 to 0.600 inch, typical, all sides
6. 0.120 to 0.130 inch diameter (reference) in stiffener
7. 0.250 inch minimum, typical, both sides
8. 0.160 inch, typical. Rivet locations from edge of crack shall be staggered between adjacent rows as shown.
9. 0.400 to 0.500 inch, typical, located from closest edge of crack
10. 0.375 to 0.500 inch, typical
11. 0.140 inch, typical from edge of stiffener
12. 0.280 inch, minimum, to edge of patch, all sides
13. 0.050 inch maximum gap
14. PN AN123338, rivet, four per stiffener required through stiffener, flange, and patch plate. Locate manufactured head on near side.
15. 0.950 to 1.050 inch
16. Coat patch and mating surface with adhesive sealant per text
17. 0.280 inch, typical to existing stiffener rivet hole
18. 0.270 inch, typical to existing stiffener rivet hole
19. 0.400 inch, typical between existing stiffener rivet holes
20. 0.520 inch, typical to existing stiffener rivet hole

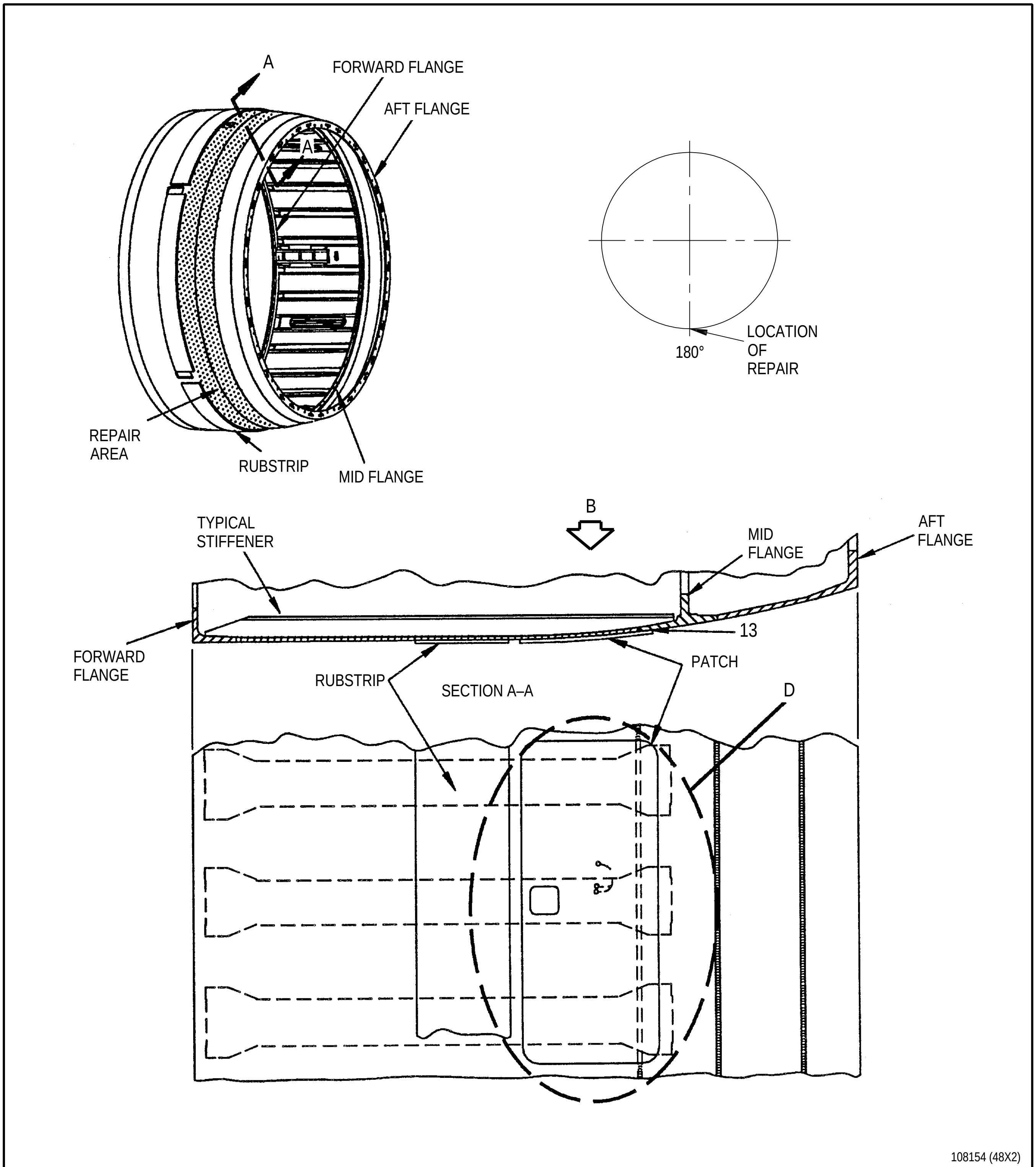


Figure 27. Augmentor Nozzle Support Assembly - Repair of Multiple Skin Cracks Into and Through Stiffener and Stiffener Weld Between Rubstrip and Mid-Flange - Method II (Sheet 1 of 4)

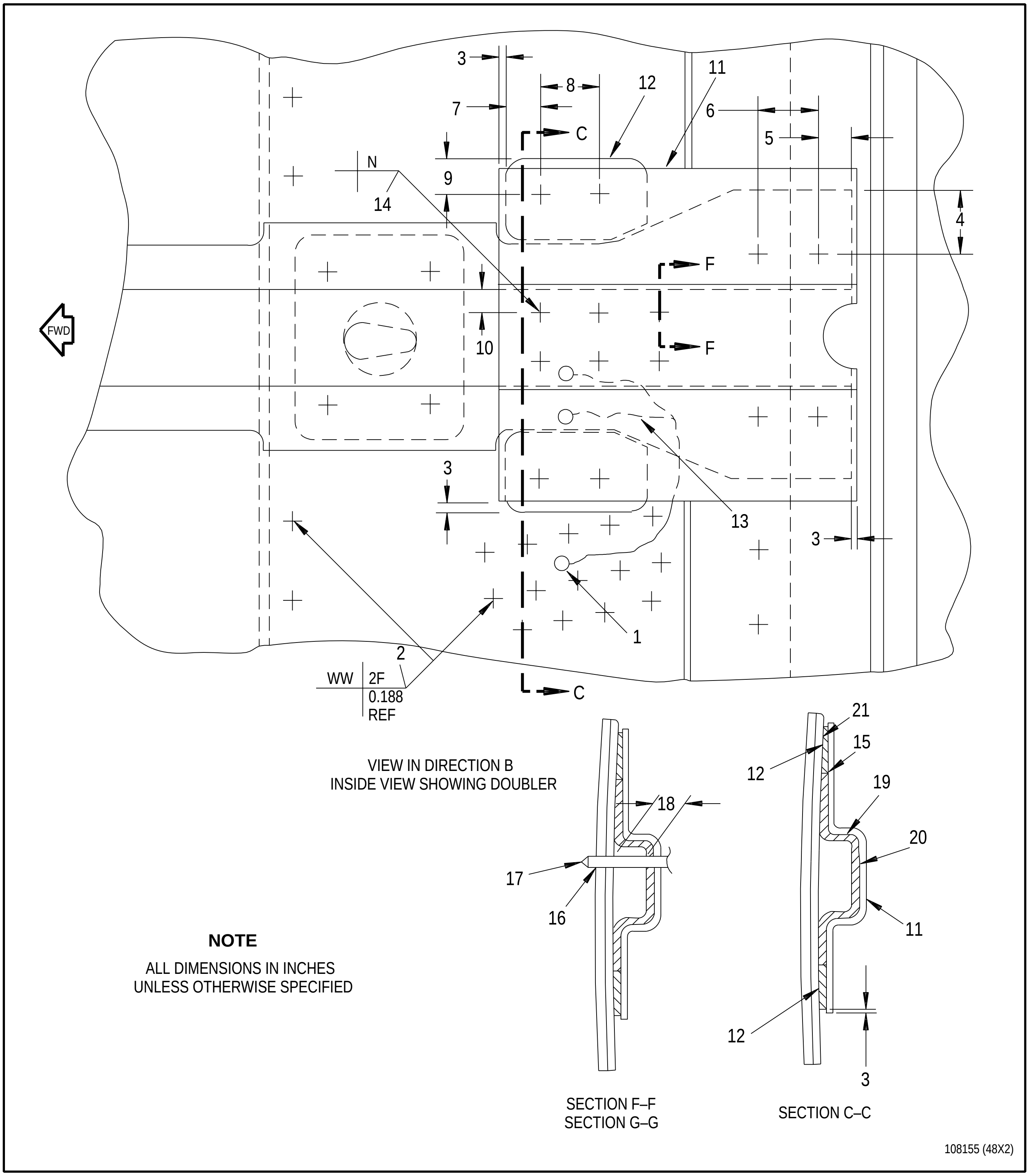


Figure 27. Augmentor Nozzle Support Assembly - Repair of Multiple Skin Cracks Into and Through Stiffener and Stiffener Weld Between Rubstrip and Mid-Flange - Method II (Sheet 2 of 4)

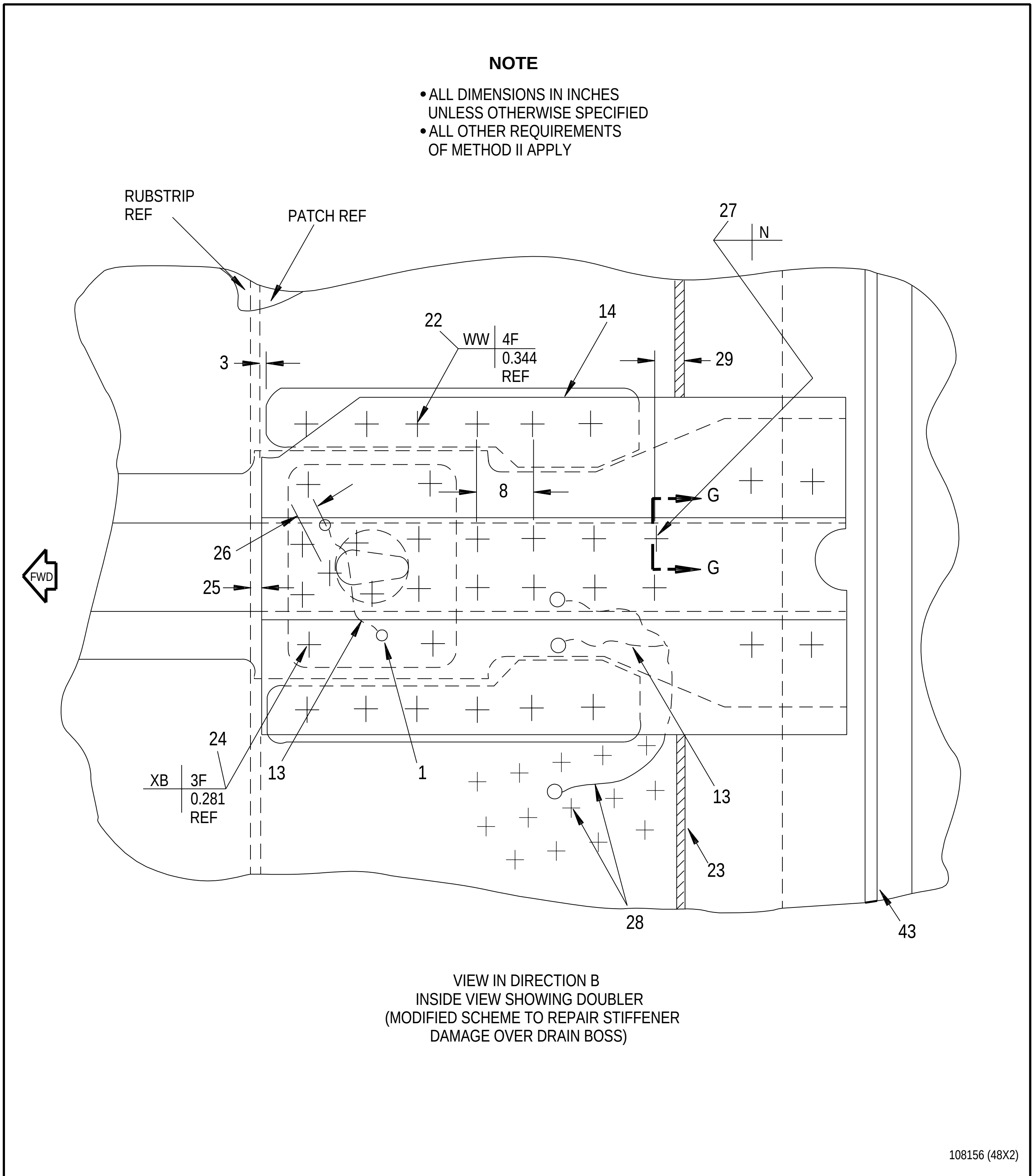


Figure 27. Augmentor Nozzle Support Assembly - Repair of Multiple Skin Cracks Into and Through Stiffener and Stiffener Weld Between Rubstrip and Mid-Flange - Method II (Sheet 3 of 4)

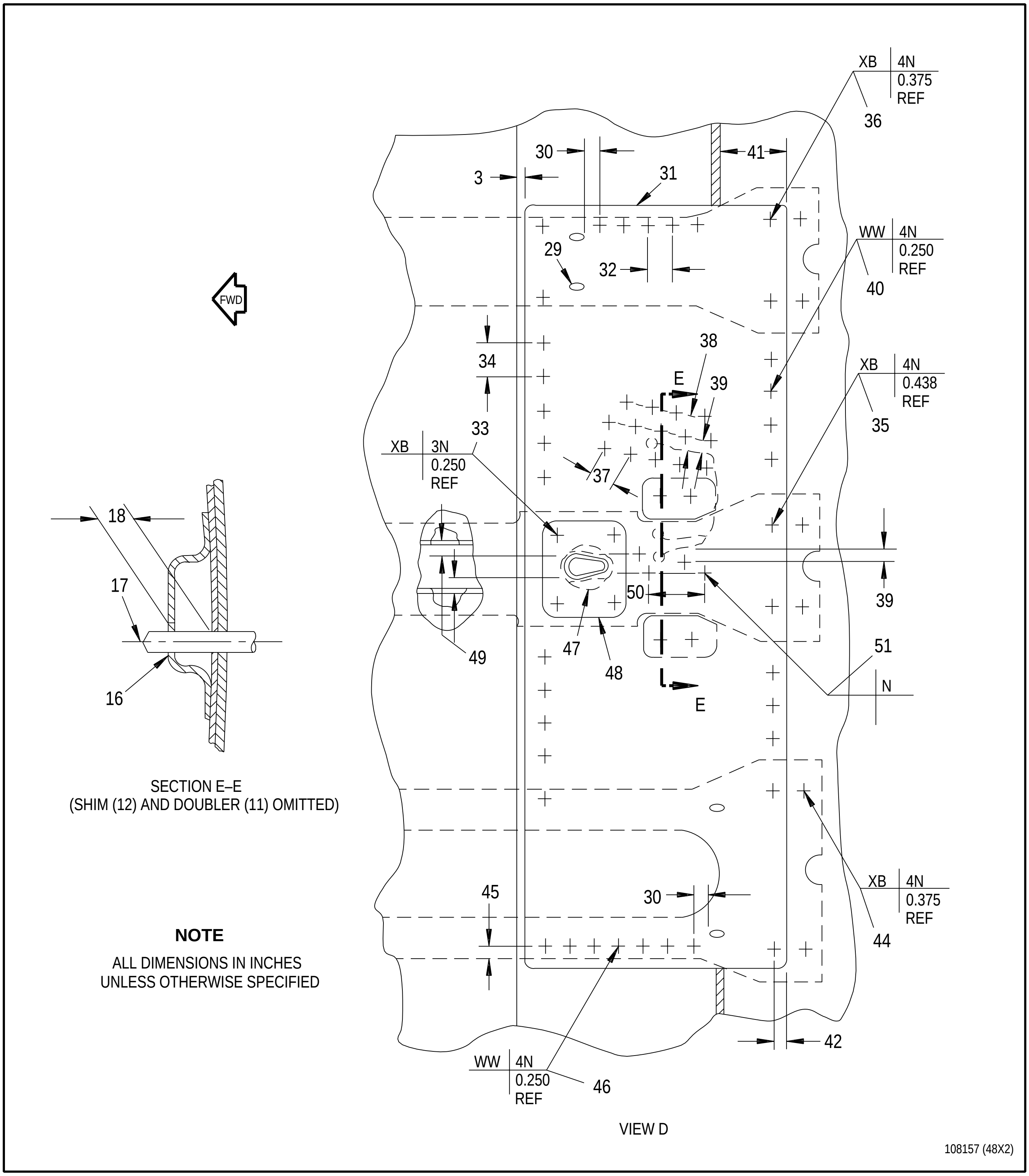


Figure 27. Augmentor Nozzle Support Assembly - Repair of Multiple Skin Cracks Into and Through Stiffener and Stiffener Weld Between Rubstrip and Mid-Flange - Method II (Sheet 4 of 4)

Legend for figure 27

1. Stop drilled hole, 0.120 to 0.130 inch diameter, as required
2. PN MS9319-004, as required spaced around crack and forward edge of patch between stiffeners, through skin and patch plate only; 0.130 to 0.290 inch from stiffener flange edge and/or circumferential weld line as applicable. Locate manufactured head on far side.
3. 0.050 inch maximum gap
4. 0.520 inch, typical to existing stiffener rivet holes
5. 0.280 inch, typical to existing stiffener rivet holes
6. 0.500 inch, typical between existing stiffener rivet holes
7. 0.280 inch minimum, typical
8. 0.500 to 0.600 inch, typical
9. 0.280 inch, minimum, typical
10. 0.200 inch, typical, from edge of stiffener, both sides
11. PN 4055310, doubler. Trim to suit, as required. See item 13.
12. Shim plate, various thickness required to fill gap, locally manufactured from AMS 4911 titanium alloy. Shim shall conform to contour of existing support. See item 13.
13. Typical crack through stiffener leg. Use doubler(11) and shim(12).
14. PN 2152845, NAS9307M-4-01, ST1173-01, rivet, six required through doubler and stiffener only. If height of stiffener(18) prevents installation of rivet, drill through skin and patch (see Section F-F). If a larger grip length is required, use PN NAS 9307M-4-02, ST1173-02, NAS9307M-4-03, or ST1173-03. Locate manufactured head on near side.
15. No gap between shim and stiffener allowed, both sides
16. At area(18) a maximum of 3 holes through stiffener and/or doubler, and a maximum of 4 holes through skin and/or patch.
17. Drill (reference)
18. Area where minimum height of existing stiffener constrains installation of rivets (14) and (51).
19. Gap, equal, both sides(0.055 inch maximum)
20. 0.010 inch maximum gap permissible between these surfaces before riveting. Gap exceeding this amount shall be reduced by use of a shim, fabricated locally from AMS 4911 titanium alloy, thickness as required to fill gap(0.015 to 0.018 typical).
21. 0.050 inch maximum gap betweeen mating surfaces after riveting, both sides
22. PN MS9319-101, rivet, as required through doubler flange, shim plate, skin, and patch plate. Locate manufactured head on far side.
23. Centerline of circumferential weld
24. PN AN123315, rivet, four required. Install in existing holes. Locate manufactured head on far side.
25. 0.050 inch maximum, from doubler to rubstrip
26. 0.160 inch, minimum
27. PN 2152845, NAS9307M-4-01 or ST1173-01, 15 maximum required through doubler and stiffener. If a larger grip length rivet is required, use PN NAS9307M-4-02, ST1173-02, NAS9307M-4-03, or ST1173-03. Located manufactured head on near side.
28. Crack and rivet pattern (reference)

Legend for figure 27 (Continued)

29. Drain hole(reference)
30. 0.250 inch minimum, typical, both sides of stiffener, from hole edge to rivet
31. Patch plate, locally fabricated per text from AMS 4911 titanium alloy, 0.015 to 0.018 inch thick
32. 0.350 to 0.450 inch, typical
33. PN AN123319, rivet, 4 places. Install in existing holes. Locate manufactured head on near side.
34. 0.500 to 0.600 inch, typical
35. PN AN123338, two required through doubler, stiffener, flange, and patch plate. Locate manufactured head on near side.
36. PN AN123337, two per stiffener without drain boss required through stiffener, flange, and patch plate. Locate manufactured head on near side.
37. 0.375 to 0.500 inch, typical
38. 0.400 to 0.500 inch typical, located from closest edge of crack
39. 0.160 inch typical. Rivet locations from edge of crack shall be staggered between adjacent rows as shown.
40. PN MS9319-098, rivet, as required, between stiffeners, through patch and flange. Locate manufactured head near side.
41. 0.750 to 0.850 inch from centerline of existing circumferential weld
42. 0.280 inch, minimum, from edge of patch, all sides
43. Mid-flange (reference)
44. PN AN123337, rivet, two per stiffener required through stiffener and flange only. Locate manufactured head on near side.
45. 0.140 inch, typical from edge of stiffener
46. PN MS9319-098, rivet, as required through stiffener, skin, and patch plate. Locate manufactured head on near side.
47. 0.678 to 0.698 inch diameter hole in patch plate(31) to match hole in skin.
48. Augmentor nozzle support boss. Remove and replace per text.
49. 0.200 inch minimum
50. 0.800 inch maximum, typical
51. PN 2152845, NAS9307M-4-01, or ST1173-01, rivet, maximum of five required. If height of stiffener(18) prevents installation of rivet, drill through top portion of stiffener(see Section F-F). Location shall be staggered in relation to rivets(14). If a larger grip length rivet is required, use PN NAS9307M-4-02, ST1173-02, NAS9307M-4-03, or ST1173-03. Locate manufactured head on near side.

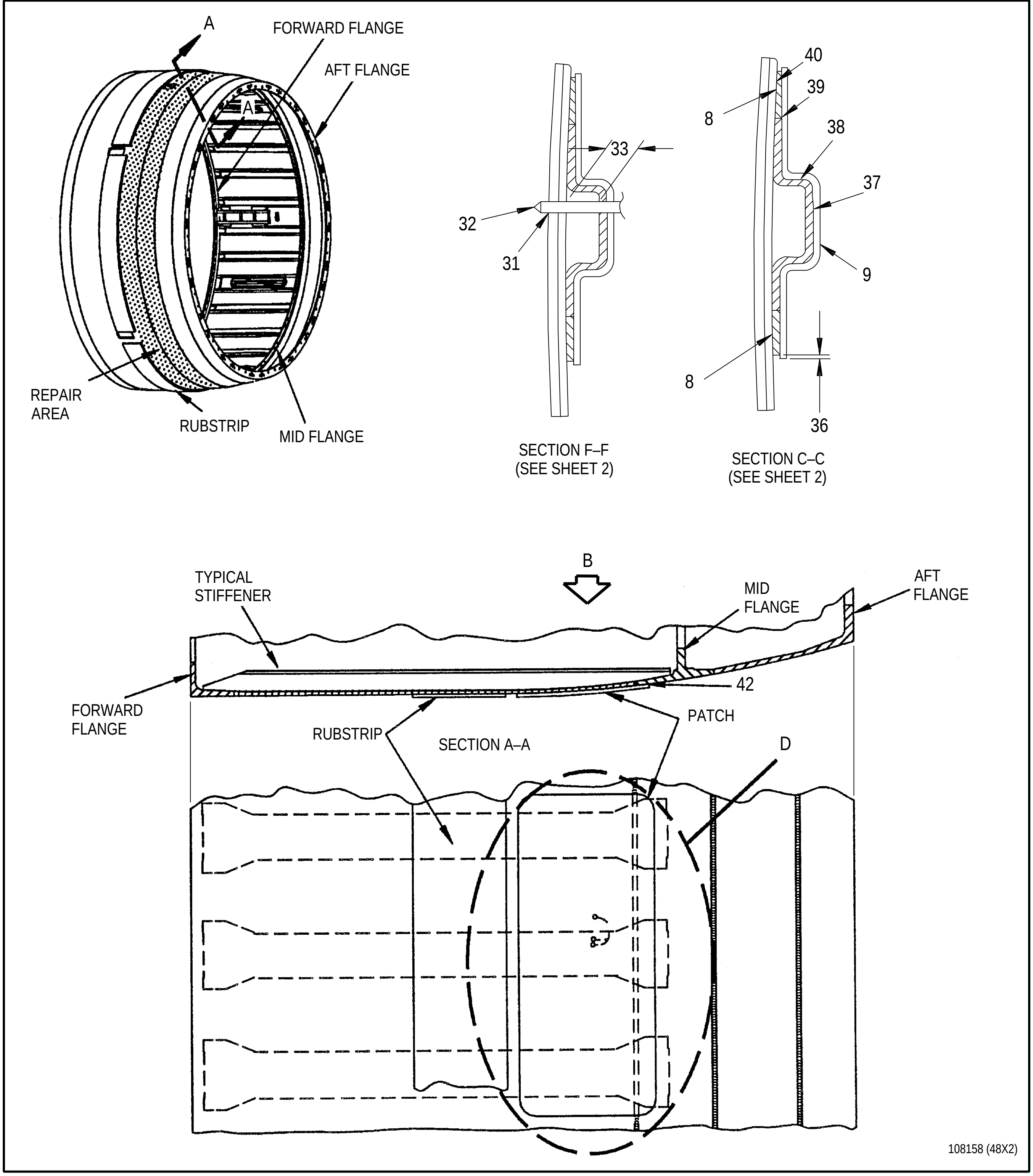


Figure 28. Augmentor Nozzle Support Assembly - Repair of Multiple Skin Cracks Into and Through Stiffener and Stiffener Weld Between Rubstrip and Mid-Flange - Method III (Sheet 1 of 3)

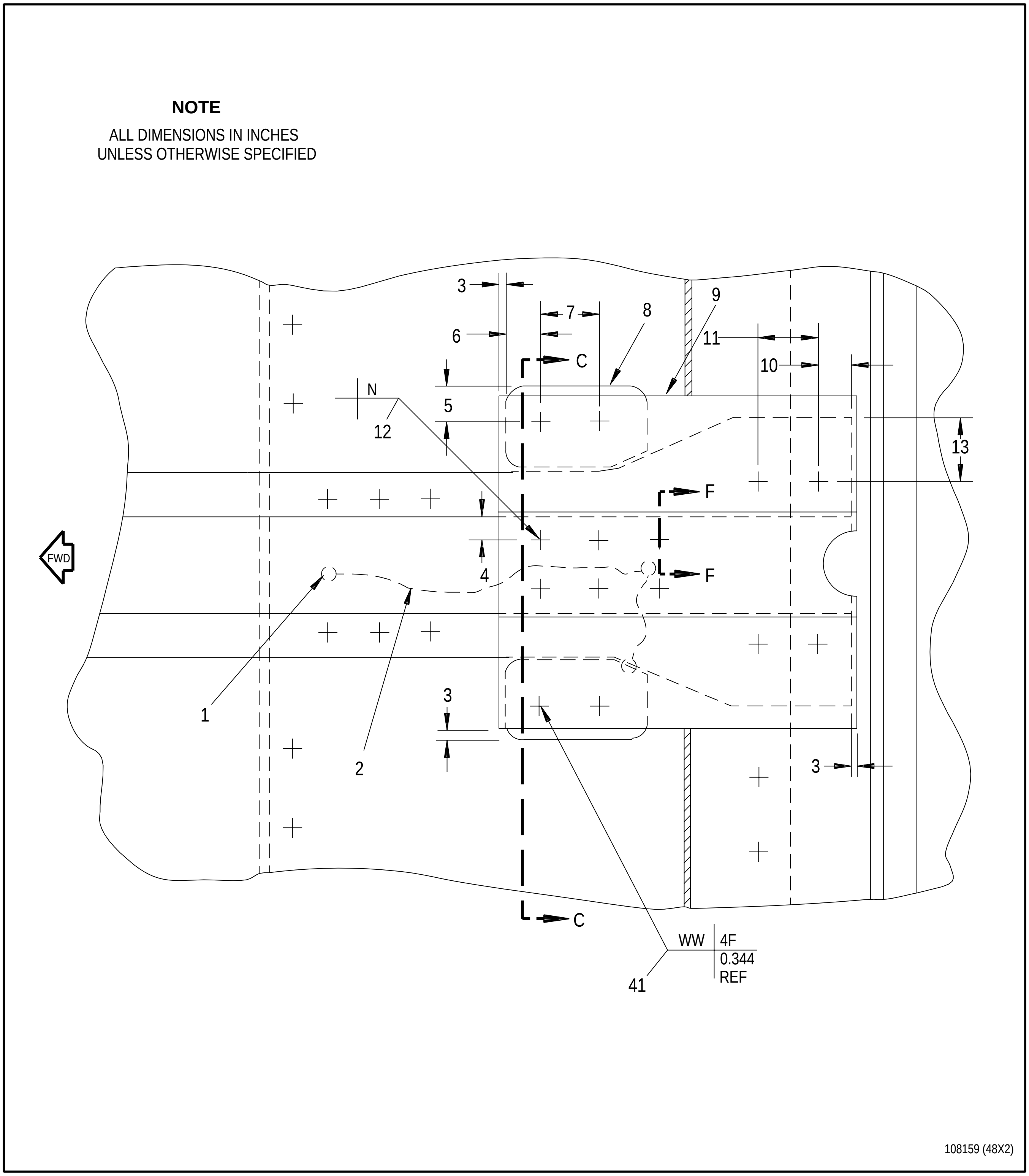


Figure 28. Augmentor Nozzle Support Assembly - Repair of Multiple Skin Cracks Into and Through Stiffener and Stiffener Weld Between Rubstrip and Mid-Flange - Method III (Sheet 2 of 3)

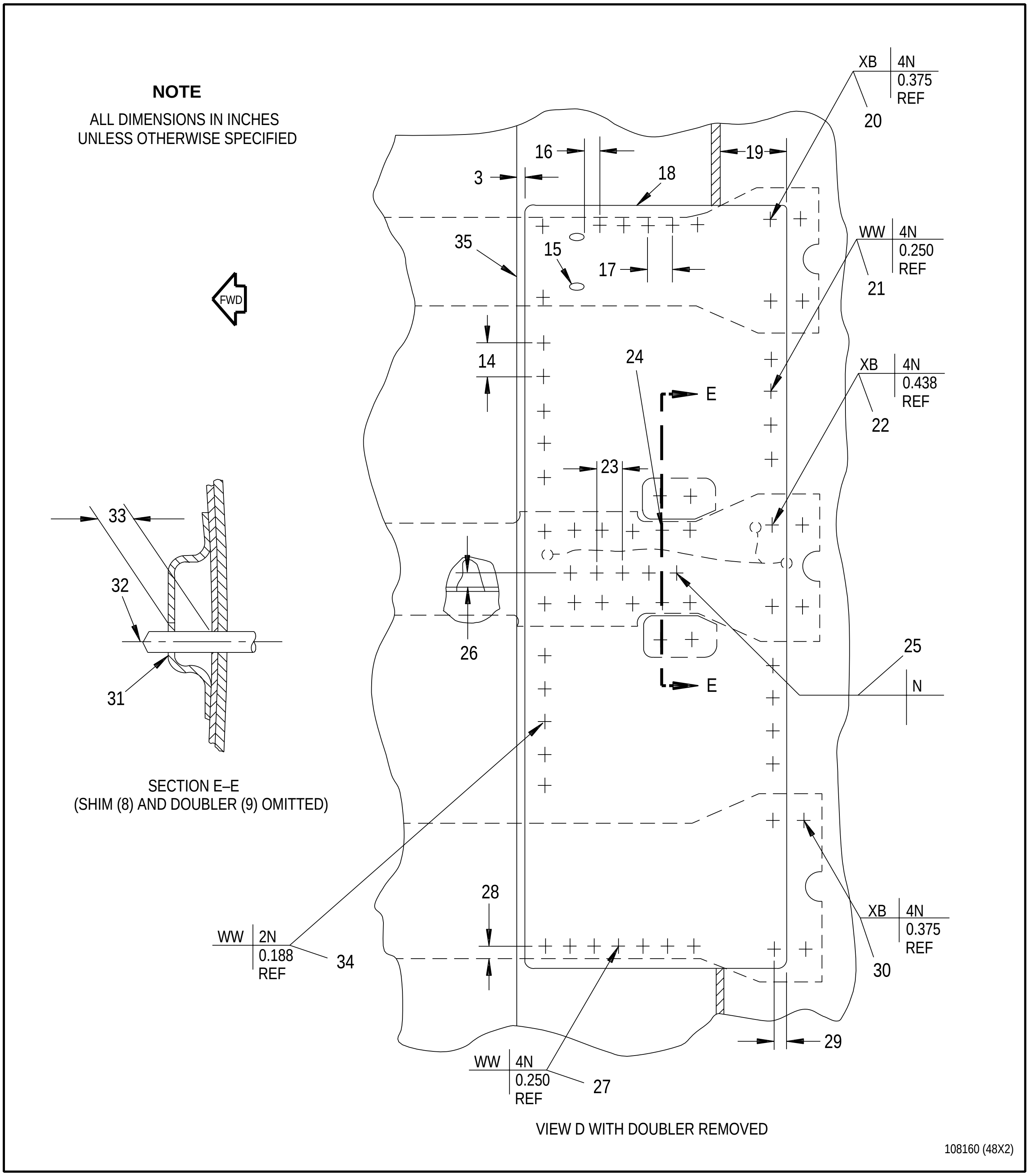


Figure 28. Augmentor Nozzle Support Assembly - Repair of Multiple Skin Cracks Into and Through Stiffener and Stiffener Weld Between Rubstrip and Mid-Flange - Method III (Sheet 3 of 3)

Legend for figure 28

1. Stop drilled hole, 0.120 to 0.130 inch diameter as required
2. Typical crack through stiffener leg. Use shim(8) and doubler(9)
3. 0.050 inch maximum gap
4. 0.200 inch, typical, both sides
5. 0.280 inch, minimum, typical
6. 0.280 inch, minimum, typical
7. 0.500 to 0.600 inch, typical
8. Shim plate, various thickness required to fill gap, locally manufactured from AMS 4911 titanium alloy. Shim shall conform to contour of existing support. See item 2.
9. PN 4055310, doubler. Trim to suit, as required. See item 2.
10. 0.280 inch, typical to existing stiffener rivet holes
11. 0.500 inch, typical between existing stiffener rivet holes
12. PN 2152845, NAS9307M-4-01, ST1173-01, rivet, six required through doubler and stiffener only. If height of stiffener(33) prevents installation of rivet, drill through skin and patch (see Section F-F). If a larger grip length is required, use PN NAS9307M-4-02, ST1173-02, NAS9307M-4-03, or ST1173-03. Locate manufactured head on near side.
13. 0.520 inch, typical to existing stiffener rivet holes
14. 0.500 to 0.600 inch, typical
15. Drain hole (reference)
16. 0.250 inch minimum, typical, both sides of stiffener, from hole edge to rivet
17. 0.350 to 0.450 inch, typical
18. Patch plate, locally fabricated per text from AMS 4911 titanium alloy, 0.015 to 0.018 inch thick
19. 0.750 to 0.850 inch from centerline of existing circumferential weld
20. PN AN123337, rivet, two per stiffener without drain boss required through stiffener, flange, and patch plate. Locate manufactured head on near side.
21. PN MS9319-098, rivet, as required, between stiffeners, through patch and flange
22. PN AN123338, two required through doubler, stiffener, flange, and patch plate. Locate manufactured head on near side.
23. 0.500 to 0.600 inch, typical
24. Do not install inner row of rivets through stiffener flanges when shim(8) and doubler(9) are being used, only along length of doubler. Resume installation through stiffener legs forward of doubler.
25. PN 2152845, NAS9307M-4-01 or ST1173-01, as required, equally spaced. If height of stiffener(33) prevents installation of rivet, drill through top portion of stiffener (see Section E-E). If a larger grip length rivet is required, use PN NAS9307M-4-02, ST1173-02, NAS9307M-4-03, or ST1173-03. Location shall be staggered in relation to rivets(12).
26. 0.200 inch, minimum
27. PN MS9319-098, as required through stiffener, skin, and patch plate. Locate manufactured head of near side.
28. 0.140 inch, typical, from edge of stiffener

Legend for figure 28(Continued)

29. 0.280 inch, minimum, all sides
30. PN AN123337, two per stiffener required through stiffener and flange only. Locate manufactured head on near side.
31. At area(33) a maximum of 3 holes through stiffener and doubler, and a maximum of 4 holes through skin and/or patch.
32. Drill (reference)
33. Area where minimum height of existing stiffener prevents installation of rivets(12) and (25).
34. PN MS9319-004, as required through skin and patch plate only. Locate manufactured head on near side.
35. Rubstrip (reference)
36. 0.050 inch maximum gap, both sides, typical
37. 0.010 inch maximum gap permissible between these surfaces before riveting. Gap exceeding this amount shall be reduced by use of a shim, fabricated locally from AMS 4911 titanium alloy, thickness as required to fill gap(0.015 to 0.018 typical).
38. Gap, equal, both sides (0.055 inch maximum)
39. No gap between shim and stiffener allowed, both sides
40. 0.050 inch maximum gap between mating surfaces with shims installed, after riveting, both sides
41. PN MS9319-101, rivet, four required through doubler, shim, skin, and patch plate. Locate manufactured head on far side.
42. Coat patch and mating surface with adhesive sealant per text.

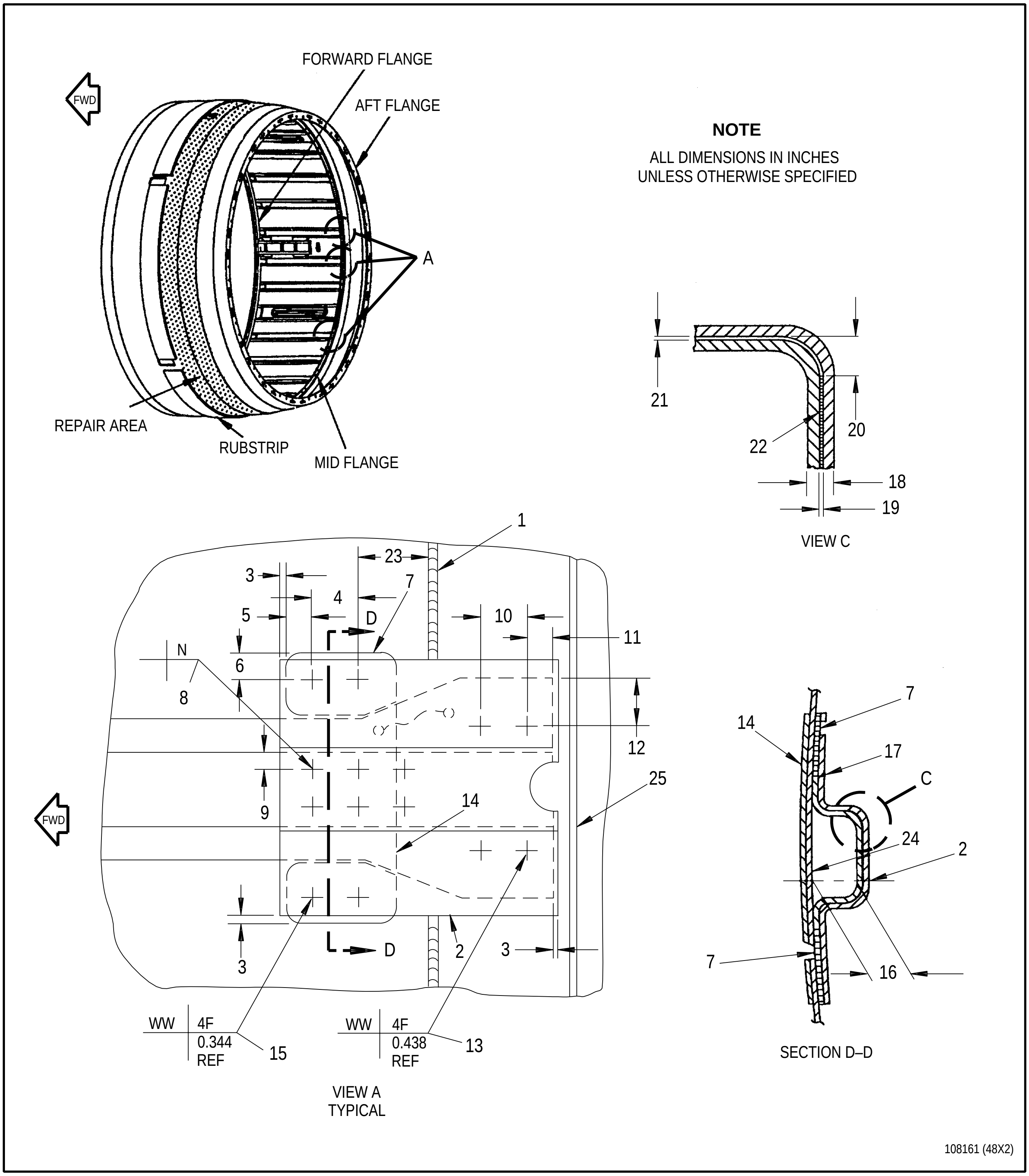


Figure 29. Augmentor Nozzle Support Assembly - Repair of Cracks in Axial Stiffener Trailing Edge Welds - Method IV

Legend for figure 29

1. Existing circumferential fusion weld
2. PN 4083135 or 4055310, doubler, trailing edge section cut to 2.65 to 2.75 inches length
3. 0.050 inch maximum gap
4. 0.500 to 0.600 inch, typical
5. 0.280 inch minimum, typical, both sides
6. 0.280 inch minimum, typical, both sides
7. Shim plate, various thickness required to fill gap, locally manufactured from AMS 4911 titanium alloy. Shim shall conform to contour of existing support.
8. PN NAS9307M-4-02, NAS9307M-4-03, ST1173-02, or ST1173-03, rivet, six required through doubler and stiffener only. Locate manufactured head on near side.
9. 0.200 inch, minimum, both sides from edge of stiffener
10. 0.500 inch, typical, between existing stiffener rivet holes
11. 0.280 inch, typical, to existing stiffner rivet hole
12. 0.500 inch, typical, to existing stiffener rivet hole
13. PN MS9319-104, rivet, four per stiffener required through doubler, stiffener, and flange. Locate manufactured head on far side.
14. Patch plate, locally fabricated per text from AMS 4911 titanium alloy (0.015 to 0.018 inch thick).
15. PN MS9319-101, rivet, four required through doubler, shim, skin, and patch plate. Locate manufactured head on far side.
16. Blind clearance
17. No gap between shim and stiffener allowed
18. Measure thickness of assembly per text.
19. Gap, 0.010 inch (with shim installed)
20. 0.125 to 0.150 inch, 2 places
21. Gap, equal both sides (0.055 inch maximum)
22. Shim material, AMS 4911 or 4911 titanium, 0.015 to 0.070 thick as required
23. 0.280 inch minimum from centerline of weld
24. Nozzle support assembly
25. Augmentor nozzle support assembly, mid-flange(reference)

WORK PACKAGE

TECHNICAL PROCEDURES

SUPPORT, AUGMENTOR NOZZLE ACTUATOR -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 5	0				
6 Blank	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
	Augmentor Nozzle Actuator Supports - Bearing replacement	
	Drift, Nozzle actuator support - - - - - - - - -	PWA 51563
	Base, Nozzle actuator support - - - - - - - - - -	PWA 51562

ILLUSTRATED SUPPORT EQUIPMENT

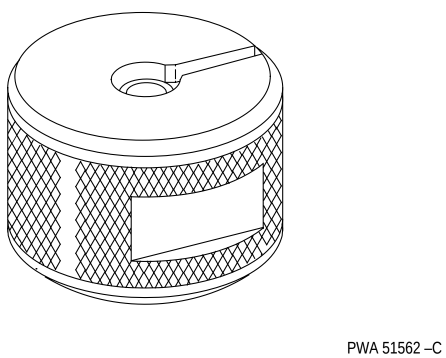


Figure T1. PWA 51562 Base

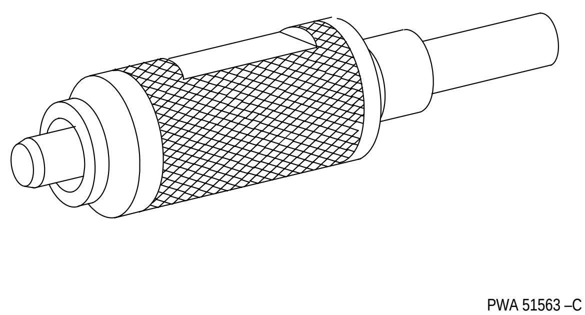


Figure T2. PWA 51563 Drift

1. INTRODUCTION.

a. This work package contains instructions for replacement of the augmentor nozzle actuator support bearing.

2. AUGMENTOR NOZZLE ACTUATOR SUPPORTS (PN 4011121 and 4011122) - BEARING REPLACEMENT.
(See Figure 1.)

CAUTION

Bearing shall be removed from larger diameter hole in actuator supports to prevent damage to parts and tools.

a. Remove bearing in actuator support with PWA 51562 base, PWA 51563 drift and an arbor press as follows:

(1) Position PWA 51562 base on arbor press with small recess up.

(2) Align actuator support on PWA 51562 base.

(3) Insert PWA 51563 drift into bearing.

(4) Press bearing out of actuator support.

b. Repeat procedure for remaining actuator supports.

NOTE

Use either PN 4005227, 4011139, or 4048593 bearings in augmentor nozzle actuator supports (PN 4045695 bearing option).

c. Install bearing in actuator support with PWA 51562 base, PWA 51563 drift, and an arbor press as follows:

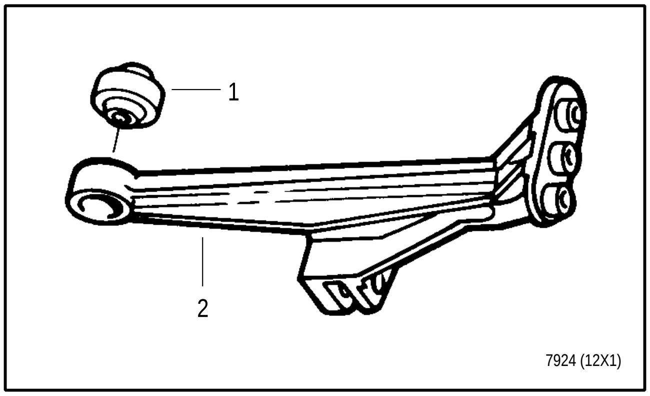
(1) Position PWA 51562 base on arbor press with large recess up.

(2) Align actuator support on PWA 51562 base.

(3) Insert PWA 51563 drift into bearing.

(4) Press bearing into actuator support.

d. Repeat procedure for remaining actuator supports.



1. Bearing
2. Augmentor Nozzle Actuator Support

Figure 1. Augmentor Nozzle Actuator Support - Bearing Replacement

WORK PACKAGE

TECHNICAL PROCEDURES

DUCT, AUGMENTOR COMBUSTION CHAMBER - (TYPICAL PN 4073475)

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 14

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	26	7 - 10	17	12	17
3 - 5	16	11	16	13 - 14	19
6	26				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Nondestructive Inspection	T.O. 2J-F100-9
Introduction and General Information	T.O. 2J-F100-53-1
General Repair Procedures - Welding, Inert Gas Fusion	SWP 093 01
General Repair Procedures - Heat Treatment: Stress-Relief Cycles (SPOP 455-1, 455-2, 455-3, 456, 457, 458-1, 458-2, 459-1, 459-2, 459-3, 460-1, 460-2, 461, 646, 466, 467, and 482)	SWP 095 02

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ADHESIVE SEALANT, SILICONE RUBBER	PWA 36003-01
ALCOHOL, ISOPROPYL (PMC 9094)	TT-I-735
CLOTH, CLEAN	-
CROCUS CLOTH OR FINE STONE	-
PENCIL (CRAYON), SILVER, METAL MARKING(HARD)	COLORBRITE SILVER NO. 2101 OR NO. 1936 (PMC 4059-7)
PRIMER, SILICONE RUBBER, RED	PWA 556
SEALANT/ADHESIVE SILICONE RUBBER	PWA 617
WELD FILLER MATERIAL	AMS 4954

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
RIVET	MS9219-052	AR
RIVET	MS9319-098	AR

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
4	AUGMENTOR COMBUSTION CHAMBER DUCT ASSEMBLY - CONICAL DUCT EXTENSION REPLACEMENT	
	GUIDE, DRILL, AUGMENTOR CONICAL DUCT EXTENSION --	PWA 55671

ILLUSTRATED SUPPORT EQUIPMENT

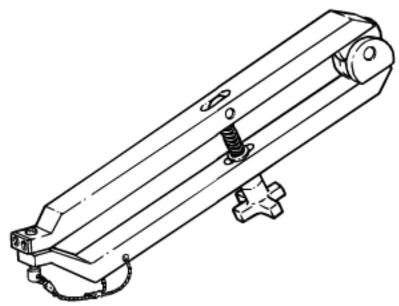


Figure T1. PWA 55671 GUIDE

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor combustion chamber duct.

2. AUGMENTOR COMBUSTION CHAMBER DUCT - BLEND REPAIR.

a. For scratches or rub marks located anywhere on duct except on panels, hand blend to 0.002 inches maximum depth using a fine stone or crocus cloth. Blend depth to width ratio must be 14 to 1 or greater. Surface finish of blended area should be as smooth or smoother than adjacent unblended areas.

b. For scratches or rub marks on panels, hand blend damaged area to remove all sharp contours on a panel. Blend depth to width ratio must be 14 to 1 or greater. Surface finish of blended area should be as smooth or smoother than adjacent unblended areas. Panel thickness of 0.022 inches minimum shall be maintained. Ultrasonic inspection technique may be used to verify thickness.

3. AUGMENTOR COMBUSTION CHAMBER DUCT SEAL - REPLACEMENT.
(See Figure 1.)

NOTE

There are two procedures for finger seal removal and replacement. If only a few seals are being replaced, remove and replace one seal at a time per step a. If all seals are being replaced go to step b.

a. Removal and replacement procedures for finger seal, if replacing four seals or less.

(1) Remove rivets from seal(3, figure 1) to be replaced. Remove seal.

(2) Inspect and repair rivet holes in duct and duct extension for cracks and elongation per WP 328 00.

(3) Install replacement seal as follows:

(a) Position replacement seal per figure 1. (Section B-B does not apply.)

(b) Transfer drill 0.096 to 0.100 inch holes, or 0.128 to 0.132 inch oversized holes, as required, into seals.

(c) Deburr holes and remove chips.

(d) Install rivets with manufactured head toward duct ID. Refer to T.O. 2-1-111. Upset rivet heads.

(4) If replacing more than one seal, remove and replace each as described in steps a.(1) through a.(3).

(5) Seal areas shown in figure 1 as follows:

(a) Clean with clean cloth dampened with isopropyl alcohol.

(b) Prime and coat surfaces per one of the following:

1 Apply PWA 556 primer. Apply PWA 617 coating. Cure cycle for PWA 617 shall be as listed for PWA 36003. See T.O. 2-1-111, Section XXI.

2 Apply PWA 36003-01 coating, no primer required. See T.O. 2-1-111, Section XXI.

CAUTION

Loss of duct seal angular position can cause premature wear and fingerseal damage.

b. Replace all 15 seals as follows:

(1) Locate the two edges of one of existing duct fingerseals(3) near bottom dead center. Place a reference mark on the inner surface of augmentor combustion chamber duct(1) and rear conical extension(2) at each edge of fingerseal. Use colorbrite silver pencil No. 2101, Dixon silver pencil No. 1936, or equivalent. These reference marks will assist in aligning fingerseals and ducts later.

(2) Remove rivets from seals(3). Remove seal and rear conical duct extension.

(3) Inspect and repair rivet holes in duct and rear conical duct extension for cracks and elongation per WP 328 00.

(4) Install replacement seals as follows:

(a) Install seals per figure 1 using C-clamp to hold seals and omitting rear conical duct extension.

(b) Transfer drill 0.096 to 0.100 inch holes, or 0.128 to 0.132 inch oversized holes, as required, into seal.

(c) Deburr holes and remove chips.

(d) Install rear conical duct extension and align marks with augmentor combustion chamber duct marks.

(e) Install seals.

(f) Install rivets in all holes with manufactured head toward duct ID. Refer to T.O. 2-1-111. Upset rivet heads.

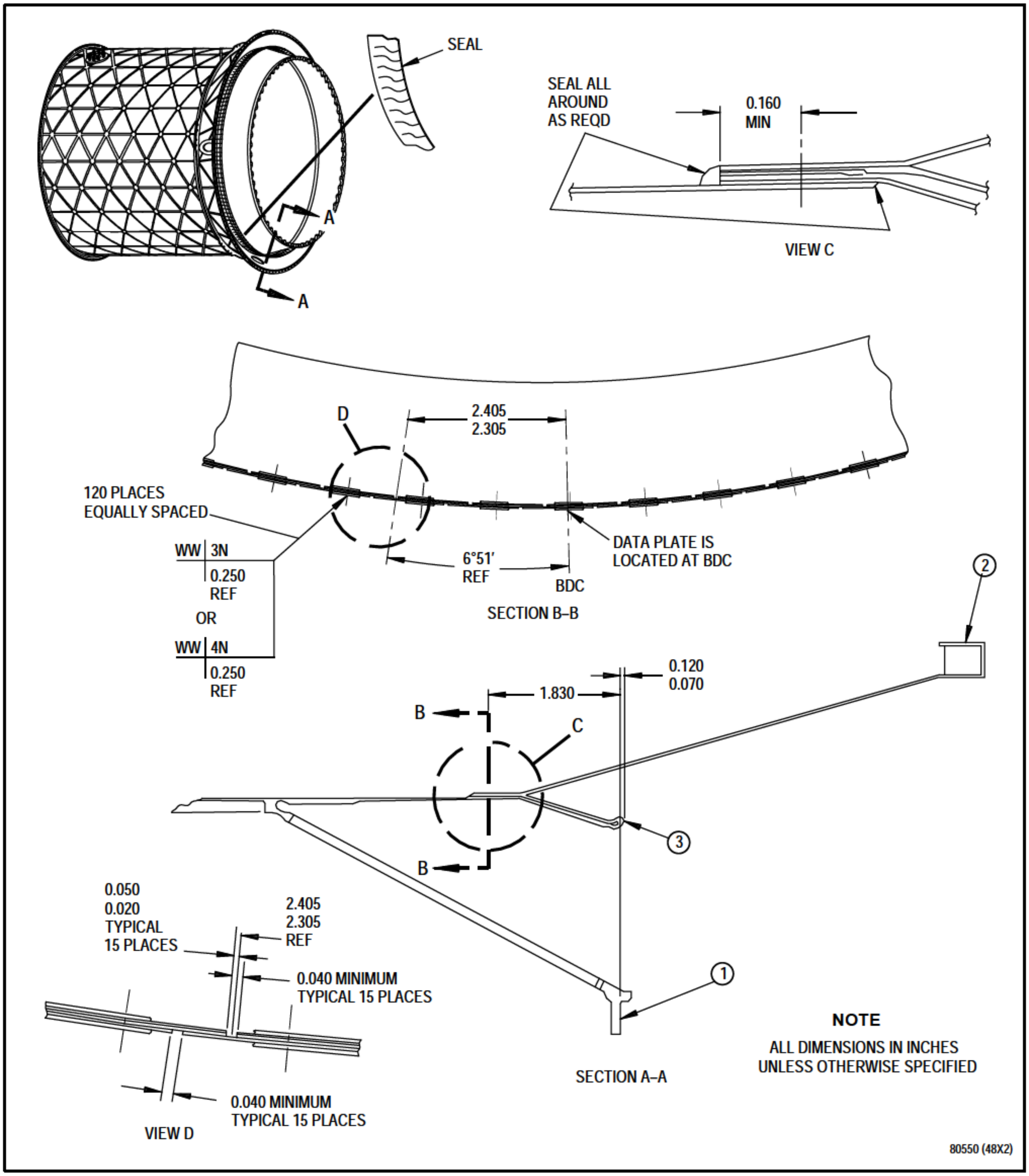
(5) Seal areas shown in figure 1 as follows:

(a) Clean with clean cloth dampened with isopropyl alcohol.

(b) Prime and coat surfaces per one of the following:

1 Apply PWA 556 primer. Apply PWA 617 coating. Cure cycle for PWA 617 shall be as listed for PWA 36003. See T.O. 2-1-111.

2 Apply PWA 36003-01 coating, no primer required. See T.O. 2-1-111.



1. Combustion chamber duct
2. Rear conical duct extension
3. Finger seal

Figure 1. Augmentor Combustion Chamber Duct Seal - Replacement

4. AUGMENTOR COMBUSTION CHAMBER DUCT ASSEMBLY - CONICAL DUCT EXTENSION REPLACEMENT

(See figure 1 and Figure 2)

CAUTION

To avoid duct assembly damage, do not enlarge holes while drilling out rivets.

a. Temporarily mark location of each serviceable seal assembly on augmentor combustion chamber duct and seal.

b. Remove rivets attaching conical duct extension and seal assembly to augmentor combustion chamber duct. Refer to T.O. 2-1-111.

c. Remove conical duct extension and seal assemblies.

d. Inspect and repair rivet holes in seals, combustion chamber duct, and duct extension for cracks and elongation per WP 328 00.

e. Position serviceable seal assemblies in same location as removed, new seal assemblies in locations requiring replacement, and new conical duct extension, on combustion chamber duct assembly. See figures 1 and 2. Align predrilled rivet holes in conical duct extension with rivet holes in seals and combustion chamber duct.

f. Transfer drill 0.096 to 0.100 inch diameter holes or 0.128 to 0.132 inch diameter oversize holes, as required, in conical duct and new seal assemblies, through existing holes in augmentor combustion chamber duct using PWA 55671 drill guide. Position drill guide on next rivet hole and repeat. Deburr drilled holes.

g. Rivet per figure 2. Refer to T.O. 2-1-111.

h. Seal areas shown in figure 2 as follows:

(1) Clean with clean cloth dampened with isopropyl alcohol.

(2) Prime and coat surfaces per one of the following:

(a) Apply PWA 556 primer. Apply PWA 617 coating. Cure cycle for PWA 617 shall be as listed for PWA 36003. See T.O. 2-1-111.

(b) Apply PWA 36003-01 coating, no primer required. See T.O. 2-1-111.

5. AUGMENTOR COMBUSTION CHAMBER DUCT ASSEMBLY - REPAIR OF CRACKED OR ELONGATED RIVET HOLES AT DUCT, SEAL, AND CONICAL DUCT EXTENSION ATTACHMENT.
(See figure 2.)

a. Repair oversized holes in augmentor combustion chamber duct or seals as follows:

(1) Temporarily mark location of each serviceable seal assembly on ducts and seal.

CAUTION

To avoid duct assembly damage, do not enlarge holes while drilling out rivets.

(2) Remove rivets attaching conical duct extension and seal assembly to augmentor combustion chamber duct. Refer to T.O. 2-1-111.

(3) Remove conical duct extension and seal assemblies.

(4) Inspect rivet holes in augmentor duct and seals for cracks and maximum dimension across holes.

NOTE

An unlimited number of holes may be repaired.

(5) If cracks are present or if dimension across hole exceeds 0.132 inch, discontinue repair. If hole is uncracked and maximum dimension across hole does not exceed 0.132 inch, repair as follows:

(a) Reposition reused conical duct extension and seals on duct assembly using temporary fasteners. Align rivet holes on all three parts to correspond with locations prior to removal of rivets.

(b) Line drill elongated holes with a cobalt or carbide No. 30 drill.

(c) Remove temporary fasteners, and deburr holes drilled in step 5.a.(5)(b), on all three parts

(d) When duct, seal, and conical duct extension are reassembled, rivet per figure 2. Refer to T.O. 2-1-111.

(6) Seal areas shown in figure 2 as follows:

(a) Clean with clean cloth dampened with isopropyl alcohol.

(b) Prime and coat surfaces per one of the following:

1 Apply PWA 556 primer. Apply PWA 617 coating. Cure cycle for PWA 617 shall be as listed for PWA 36003. See T.O. 2-1-111.

2 Apply PWA 36003-01 coating, no primer required. See T.O. 2-1-111.

b. Repair oversized holes in conical duct extension as follows:

(1) Temporarily mark location of each serviceable seal assembly on ducts and seal.

CAUTION

To avoid duct assembly damage, do not enlarge holes while drilling out rivets.

(2) Remove rivets attaching conical duct extension and seal assembly to augmentor duct. Refer to T.O. 2-1-111.

(3) Remove conical duct extension and seal assemblies.

(4) Inspect rivet holes in duct extension for cracks and maximum dimension across holes. Repair per step 5.b.(5) or step 5.b.(6).

NOTE

An unlimited number of holes may be repaired.

(5) If hole is uncracked and maximum dimension across hole does not exceed 0.132 inch, repair as follows:

(a) Reposition reused conical duct extension and seals on duct assembly using temporary fasteners. Align rivet holes on all three parts to correspond with locations prior to removal of rivets.

(b) Line drill elongated holes with a cobalt or carbide No. 30 drill.

(c) Remove temporary fasteners, and deburr holes drilled in step 5.b.(5)(b), on all three parts

(d) Go to step 5.b.(7)(d).

(6) If cracks are present in conical duct extension or if dimension across hole exceeds 0.132 inch, weld repair as follows:

(a) Clean area requiring weld repair to remove any adhesive, dirt, or surface oxides. Refer to T.O. 2-1-111.

(b) Using AMS 4954 weld filler material, weld cracks and puddle weld shut elongated holes. Refer to T.O. 2J-F100-53-1, SWP 093 01. Minimize heat input to avoid warping.

(c) Blend welds flush to 0.005 inches above parent material.

(d) Locally stress relieve all weld repairs. Refer to T.O. 2J-F100-53-1, SWP 095 02 (cycle 11).

(e) Fluorescent penetrant inspect welded areas per SPOP 70. Refer to T.O. 2-1-111, except no cracks allowed. Rout out cracks and repeat steps 5.b.(6)(a) through 5.b.(6)(d), if cracks are found.

(7) Reassemble duct as follows:

(a) Reposition conical duct extension and duct seals on duct assembly using temporary fasteners. Align rivet holes on all three parts to correspond with locations prior to removal of rivets.

(b) Line drill welded holes with a cobalt or carbide No. 30 drill.

(c) Remove temporary fasteners, and deburr holes drilled in step 5.b.(7)(b), on all three parts

(d) When duct, seal, and conical duct extension are reassembled, rivet per figure 2. Refer to T.O. 2-1-111, Section XII.

(8) Seal areas shown in figure 2 as follows:

(a) Clean with clean cloth dampened with isopropyl alcohol.

(b) Prime and coat surfaces per one of the following:

1 Apply PWA 556 primer. Apply PWA 617 coating. Cure cycle for PWA 617 shall be as listed for PWA 36003. See T.O. 2-1-111, Section XXI.

2 Apply PWA 36003-01 coating, no primer required. See T.O. 2-1-111, Section XXI.

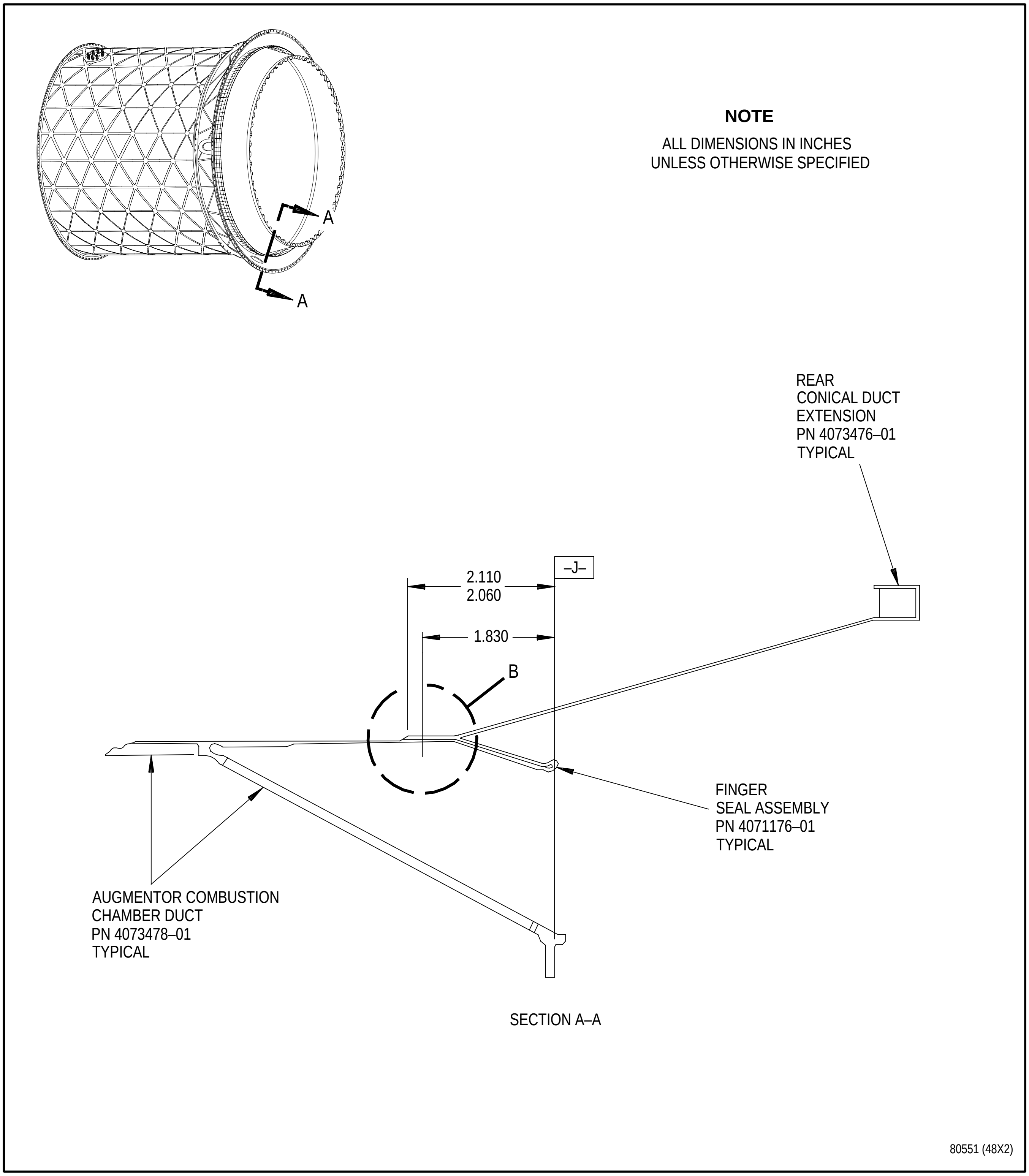
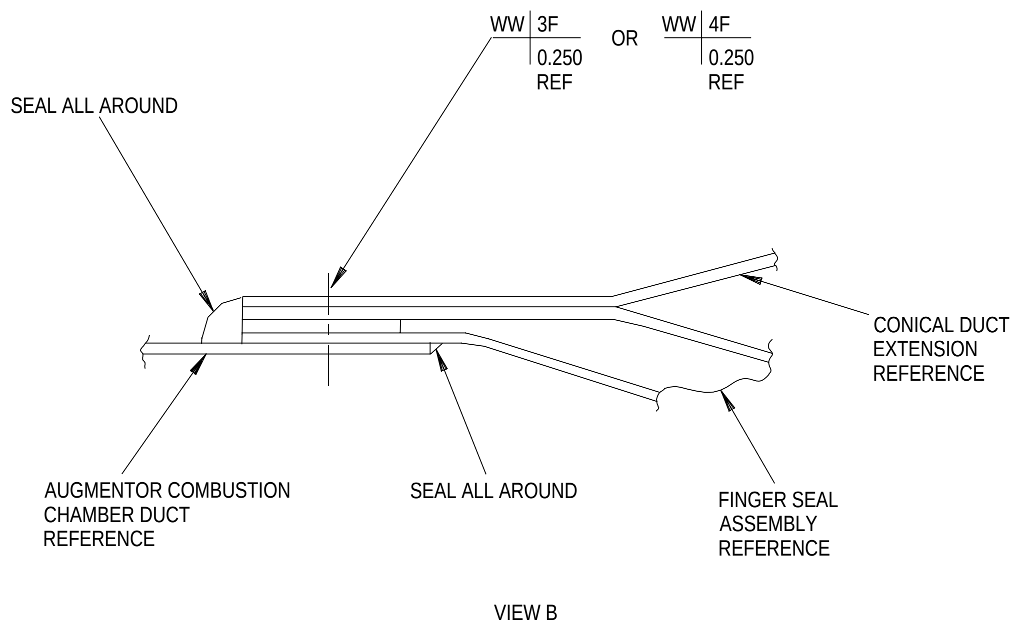


Figure 2. Augmentor Combustion Chanber Assembly Conical Duct Replacement - Typical PN 4073475 (Sheet 1 of 2)



NOTE

ALL DIMENSIONS IN INCHES
UNLESS OTHERWISE SPECIFIED

80552 (48X2)

Figure 2. Augmentor Combustion Chanber Assembly Conical Duct Replacement - Typical PN 4073475 (Sheet 2 of 2)

6. AUGMENTOR COMBUSTION CHAMBER DUCT - IDENTIFICATION PLATE REPLACEMENT.

a. Remove rivets securing damaged plate to duct.

b. Transfer data from old plate to new plate. Refer to T.O. 2-1-111 for marking methods.

c. Install replacement plate on duct OD, maintaining 0.220 inch plate edge to rivet hole center line dimension.

d. Transfer drill 0.096 to 0.100 inch rivet holes.

e. Install rivets (manufactured head location optional). Upset rivets.

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL, AUGMENTOR NOZZLE SUPPORT -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection Procedures - - - - - - - - - - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains instructions for repair of augmentor convergent nozzle segment.

2. AUGMENTOR NOZZLE SUPPORT SEAL - BLEND REPAIR.
(See Figure 1.)

a. Blending requirements are as follows:

(1) All local blending shall extend to a distance of at least 15 times depth of damage from center of blend.

(2) Surface finish of all blends shall be as smooth or smoother than original finish.

(3) Do not exceed maximum blend depth of 0.250 inch.

b. Blend repair serviceable nicks, tears, and cracks as follows:

(1) Use fine stone.

(2) Remove raised metal as required.

(3) Blend damage to a maximum depth of 0.250 inch.

c. Fluorescent penetrant inspect per T.O. 2J-F100-9. No cracks permitted.

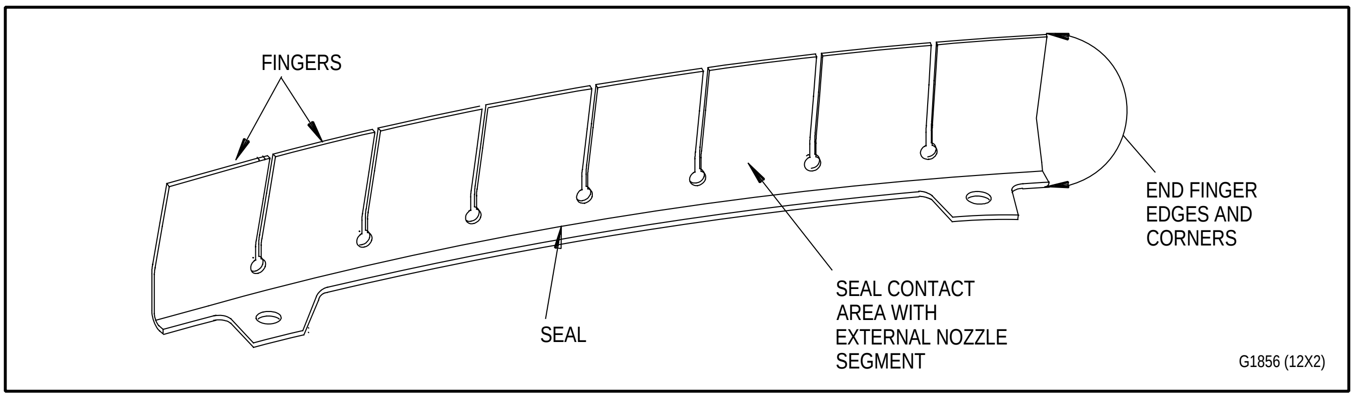


Figure 1. Augmentor Nozzle Support Seal - Blend Repair

WORK PACKAGE

INTRODUCTION

AUGMENTOR DUCT AND NOZZLE MODULE -

ASSEMBLY OF SUBASSEMBLIES

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	0				

1. INTRODUCTION.

a. This work package introduces the 600 00 through 699 00 series of work packages for the augmentor duct and nozzle module subassemblies. The following work packages are included in this series.

WP No.	Title
601 00	Nozzle Segment, Convergent, Augmentor - Assembly
602 00	Seals and Convergent Liner, Augmentor Nozzle Segment - Assembly
603 00	Augmentor Nozzle Assembly - Assembly
604 00 through 699 00	Open

WORK PACKAGE

TECHNICAL PROCEDURES

NOZZLE SEGMENT, CONVERGENT, AUGMENTOR -

ASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 20

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	21	5	21	11 - 12	0
2	0	6	16	13	11
3 - 4	16	7	11	14	4
4A	13	8 - 9	0	15 - 17	0
4B Blank Added	7	10	13	18 Blank	7

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, ANTIGALLING (PWA 36545)	EVERLUBE 382
LOCKWIRE (0.040 INCH DIAMETER)	MS9226-05
PENCIL (CRAYON), SILVER, METAL MARKING (HARD)	COLOR-TEX NO. 1843 GENERAL PENCIL CO.
TAPE, MASKING (CLOTH BACKING) (PMC 4001)	92T RED TUCK INDUSTRIES, INC. OR NO. 222 KENDALL CO OR CC 150 - 01B RED J.B. PRATA, LTD. OR CP 1315 CHATFIELD PAPER CO.

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
LOCKNUT	4058231	30
WASHER, KEY	4001648	15

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	AUGMENTOR, CONVERGENT, NOZZLE SEGMENTS - INSTALLATION OF AUGMENTOR NOZZLE LEVER	
	DRIFT, GUIDE ANTIROTATION	PWA 55457
	PUSHER, AUGMENTOR NOZZLE LEVER BEARINGS	PWA 56653 OR
	PUSHER, NOZZLE LEVER (BALL) BEARINGS	PWA 51751
	PUSHER, LEVER ASSEMBLY ONTO GUIDE	PWA 55454
	DRIFT, BEARING ONTO GUIDE (LOWER)	PWA 55452
	DRIFT, BEARING ONTO GUIDE (UPPER)	PWA 55453
	DRIFT, AUGMENTOR NOZZLE LEVER BEARING	PWA 56510
	WRENCH, BELLCRANK RETAINING NUT, CONVERGENT	PWA 55867
	PUSHER/PULLER, AUGMENTOR CONVERGENT SEGMENT BUSHINGS	PWA 57790 OR
	PUSHER/PULLER, IGV RCVV OUTER BUSHINGS AND AUG CONV SEGMENT BUSHINGS	PWA 57535

ILLUSTRATED SUPPORT EQUIPMENT

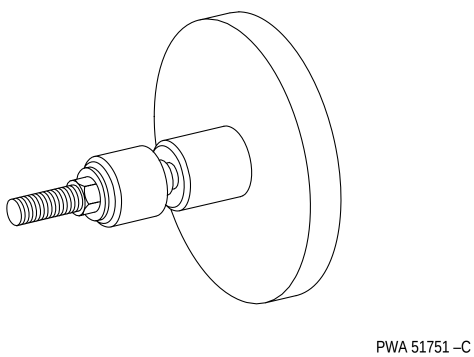


Figure T1. PWA 51751 PUSHER

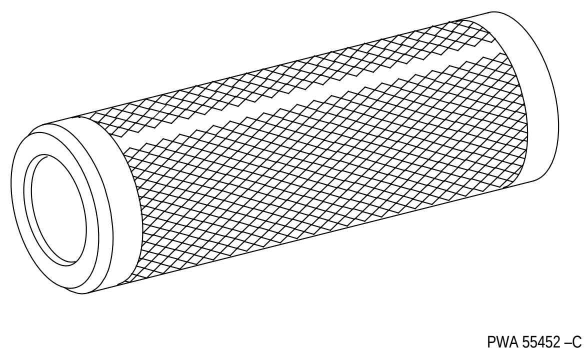


Figure T2. PWA 55452 DRIFT

ILLUSTRATED SUPPORT EQUIPMENT (continued)

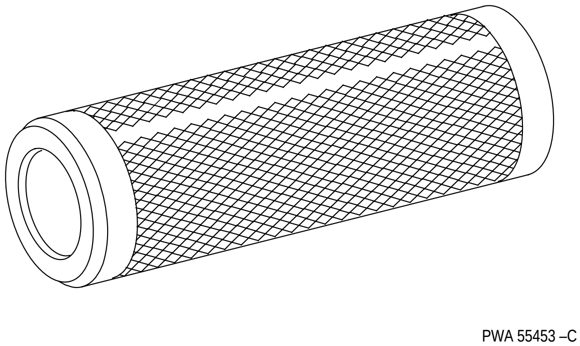


Figure T3. PWA 55453 DRIFT

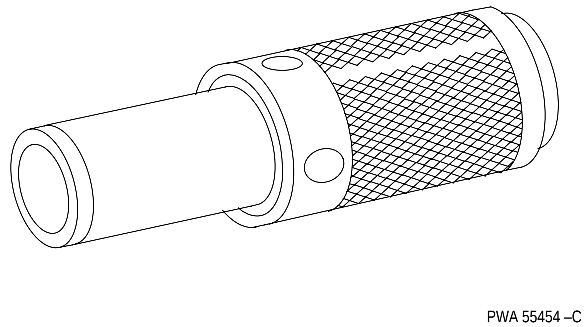


Figure T4. PWA 55454 PUSHER

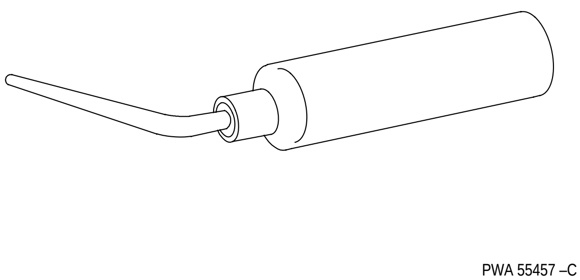


Figure T5. PWA 55457 DRIFT

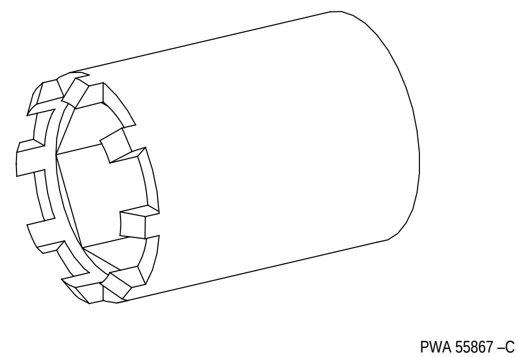


Figure T6. PWA 55867 WRENCH

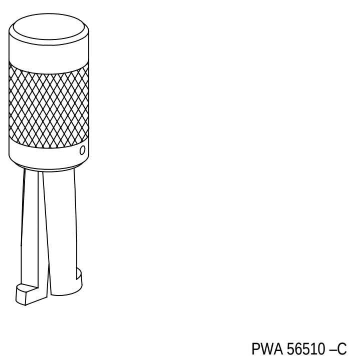


Figure T7. PWA 56510 DRIFT

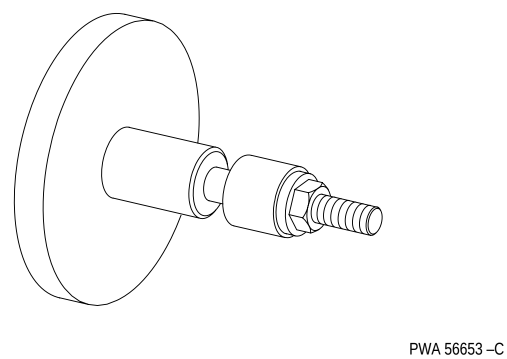


Figure T8. PWA 56653 PUSHER

ILLUSTRATED SUPPORT EQUIPMENT (continued)

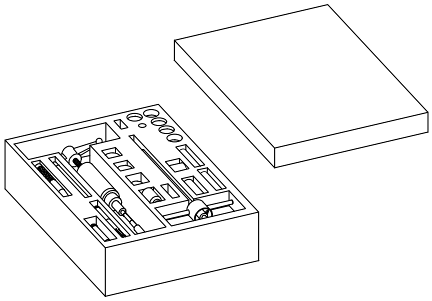


Figure T9. PWA 57535 PUSHER/PULLER

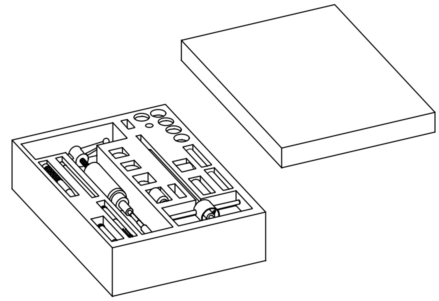


Figure T10. PWA 57790 PUSHER/PULLER

1. INTRODUCTION.

a. This work package contains instructions for assembly of the augmentor convergent nozzle segment.

2. AUGMENTOR, CONVERGENT, NOZZLE SEGMENTS - INSTALLATION OF AUGMENTOR NOZZLE LEVER.

(See Figure 1.)

a. Assemble augmentor nozzle lever and connecting links as follows:

(1) Apply PWA 36545 antigalling compound to nuts.

(2) Position lever rear side up.

(3) Install thicker ball end of connecting link into lever. Secure with bolt and nut per figure 1, sheet 1. Ensure bolt head engages locking feature in lever. Torque nuts 62 to 72 pound-inches.

(4) Repeat steps (1) through (3) for remaining connecting links.

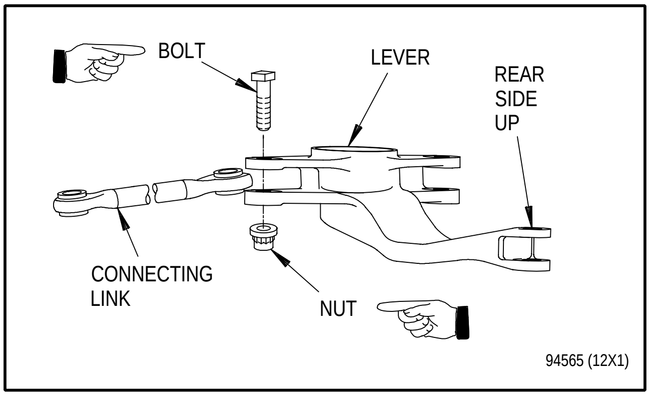


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 1 of 12)

b. Chill guide if required. Install guide using PWA 55457 drift to align slot in convergent nozzle segment with hole in guide.

c. If augmentor nozzle levers already contain ball bearings, proceed to step h.

d. If ball bearings have not been previously installed in augmentor nozzle lever, install lower ball bearing as follows:

CAUTION

Do not push bearing beyond seat. Pusher may damage bearing.

(1) Install lever rear side up (long lever arm in down position) on detail-1 base of PWA 56653 pusher.

(2) Install ball bearing shield up.

(3) Install detail-2 drift, detail-3 washer, and detail-4 nut on threaded post of detail-1 base.

(4) Tighten detail-4 nut to seat bearing. Remove lever from pusher.

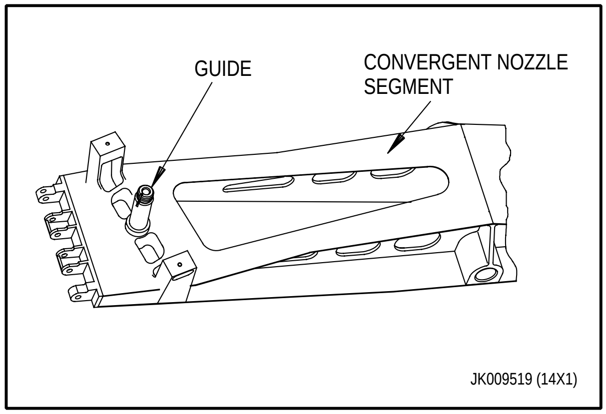


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 2 of 12)

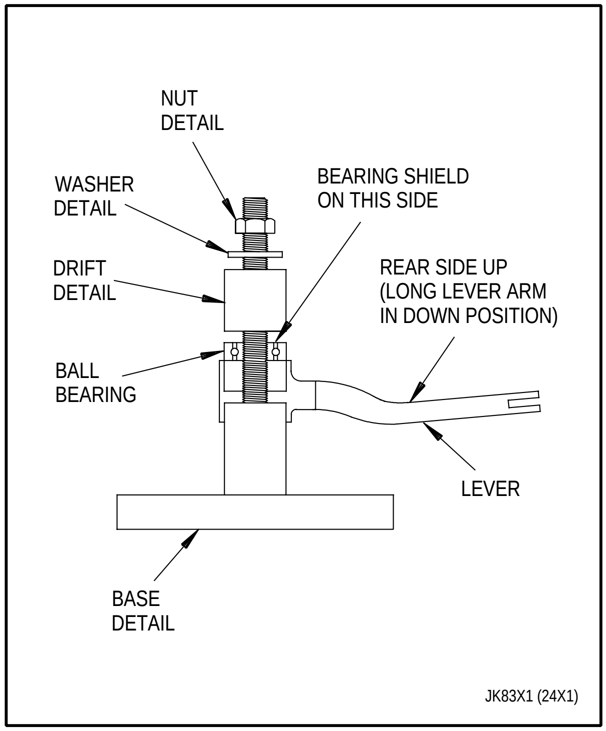


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 3 of 12)

e. Align guide by installing PWA 55457 drift in antirotation hole of guide.

f. Manually install lever front side up (long lever arm in up position) onto guide with lever and connecting links positioned. If lever does not slide on easily, proceed as follows:

(1) Push lever to bottom of guide threads using the smaller OD end of PWA 55454 pusher.

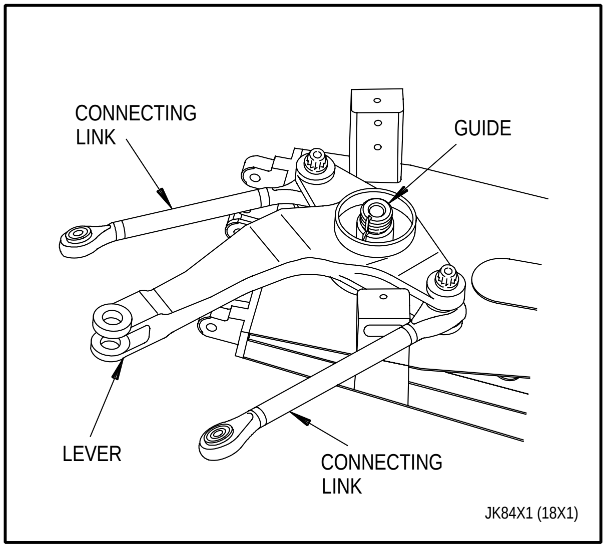


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 4 of 12)

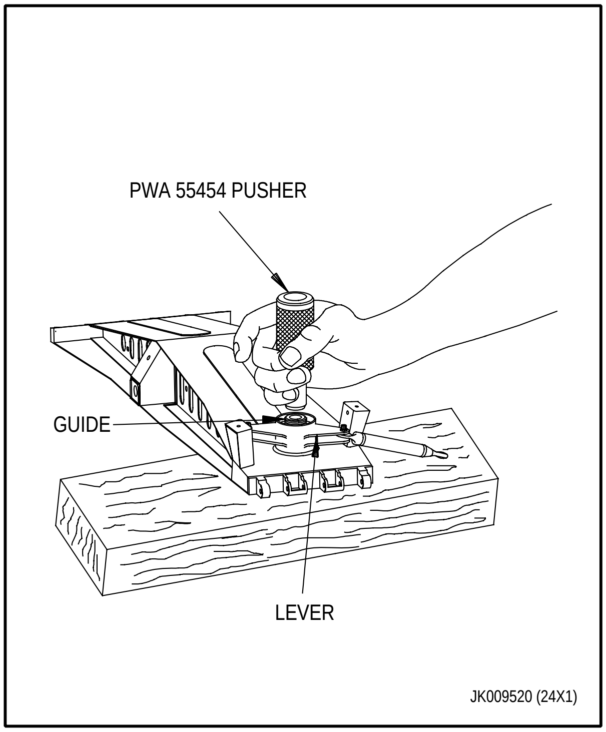


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 5 of 12)

CAUTION

Do not push bearing beyond firm seat. Drift may damage bearing.

(2) Place PWA 55452 drift over bearing. Seat bearing and lever onto guide using drift and suitable ball peen hammer.

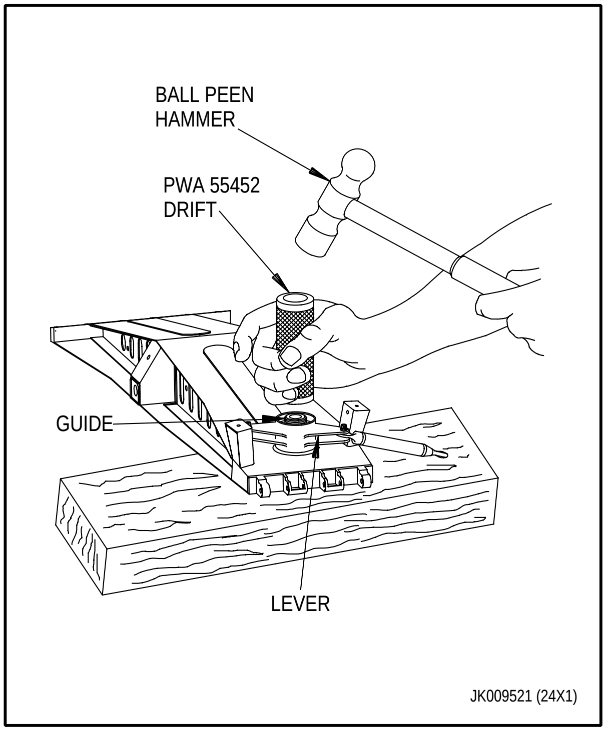


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 6 of 12)

g. Install upper bearing with shieldface up as follows:

(1) Using larger OD end of PWA 55454 pusher, push bearing to end of thread on guide.

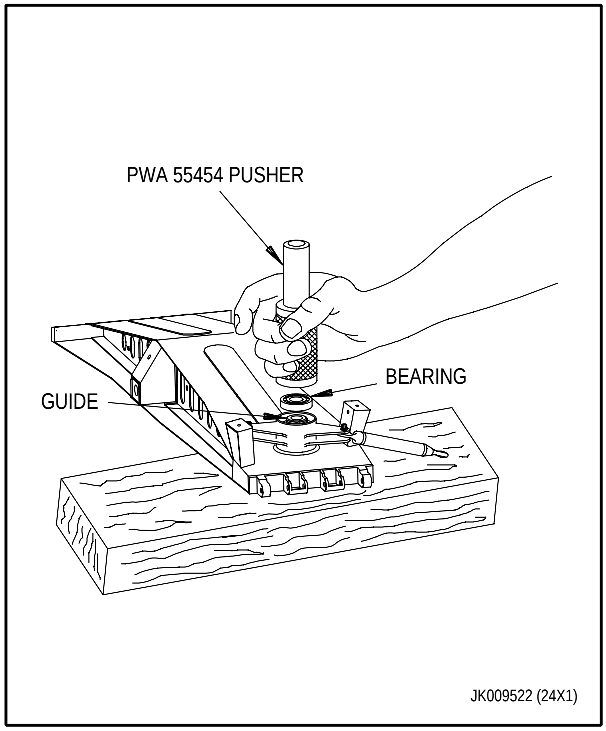


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 7 of 12)

CAUTION

Do not push bearing beyond firm seat. Drift may damage bearing.

(2) Place PWA 55453 drift over bearings. Tap bearing until seated in lever.

h. For levers with ball bearings previously installed, manually install levers onto guides. If difficulty occurs, proceed as follows:

(1) Remove upper bearing from lever as follows:

(a) Position lever rear side up on two wooden blocks or equivalent.

(b) Pull PWA 56510 drift detail-7 feet out of handle and collapse feet.

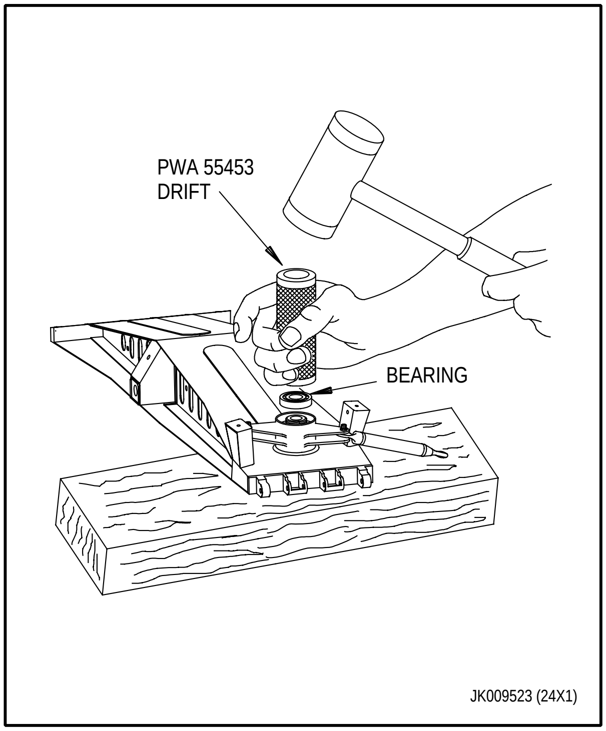


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 8 of 12)

(c) Pass detail-7 feet through bore of lower bearing.

(d) Push handle down lightly to expand and lock detail-7 feet between bearings. Ensure detail-7 feet are aligned with two slots in bore of lever.

(e) Hold lever firmly and unseat upper bearing using light, nonmetallic mallet.

(2) Install lever onto guide per step f.

(3) Install upper bearing per step g.

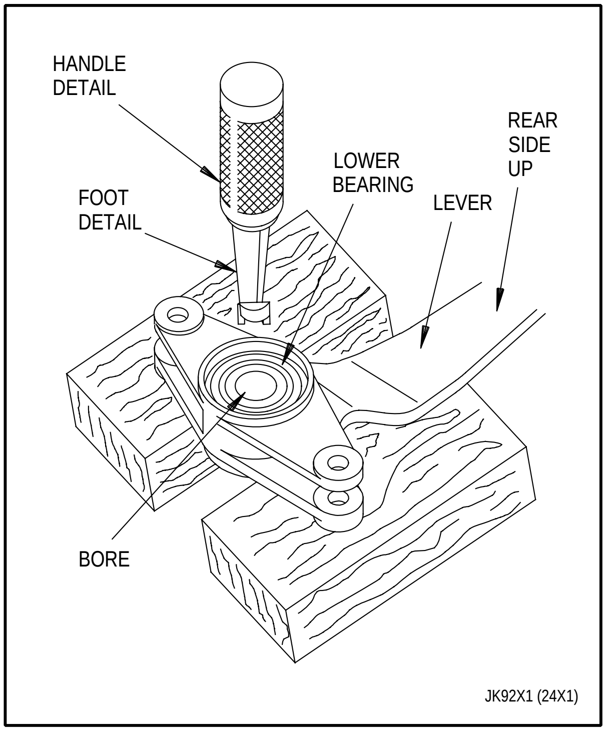


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 9 of 12)

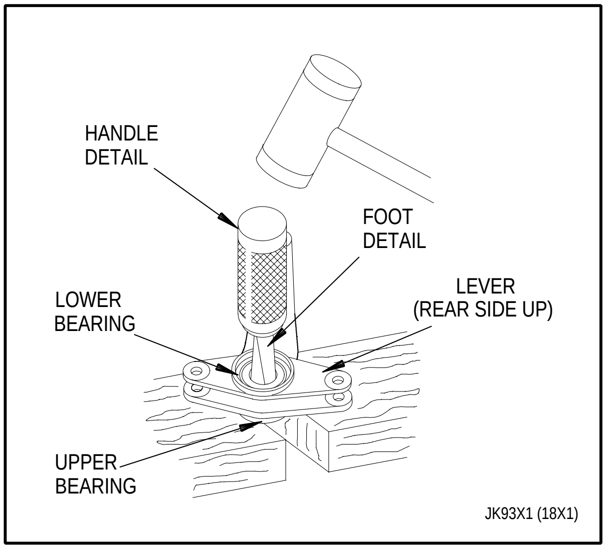


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 10 of 12)

CAUTION

Use new key washer. Use of old key washer can result in disengagement of attaching hardware.

i. Install PN 4001648 key washer. Position single tab on ID of key washer in groove of guide. Mark OD of key washer and guide in line with each other.

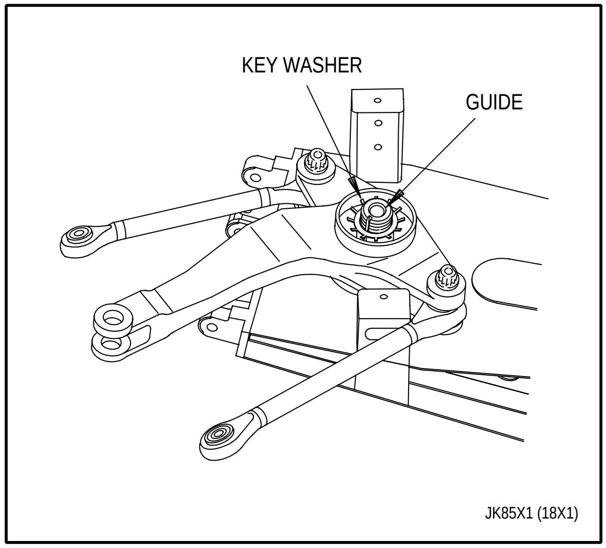


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 11 of 12)

j. Ensure that PWA 55457 is installed in hole in convergent segment and guide to act as countertorque when tightening nut.

k. Install nut beveled side down. Thread nut onto guide.

l. Torque nut using PWA 55867 wrench as follows:

(1) Tighten nut 20 to 30 pound-inches.

(2) Loosen nut to zero pound-inch.

(3) Tighten nut to 5 to 10 pound-inches. If necessary, advance nut to next tablock position. Do not exceed this position. Ensure antirotation hole in guide is in alignment with hole in convergent nozzle segment.

m. Check alignment marks on guide and key washer. If marks are in line, bend all tabs of key washer up against nut. At least one tab shall be in one slot in nut. If they are not aligned, remove nut and check key washer for bent, cracked, or broken tab.

n. Tape connecting links and lever together as shown.

o. Remove PWA 55457 from antirotation hole in guide. Ensure that nut/guide assembly cannot be rotated manually. If it can, retorque nut per steps k. through m.

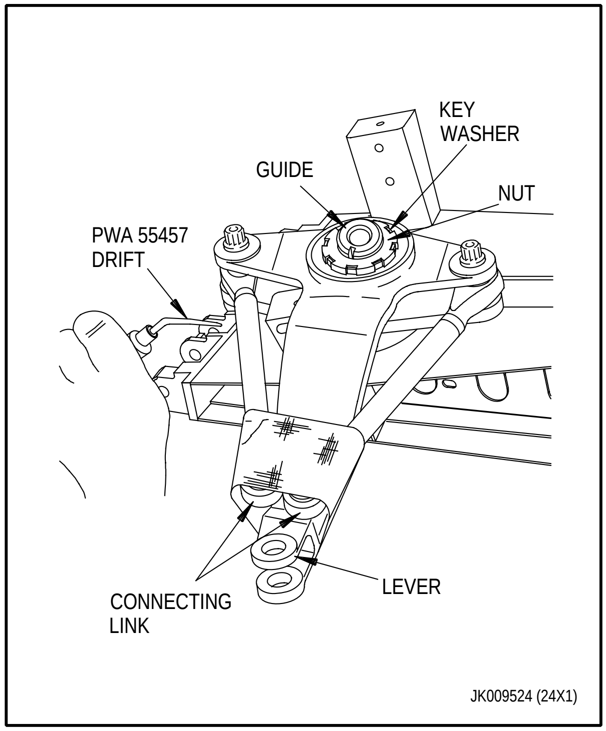


Figure 1. Augmentor Nozzle Segments - Installation of Augmentor Nozzle Lever (Sheet 12 of 12)

3. AUGMENTOR CONVERGENT NOZZLE SEGMENT - ASSEMBLY.
(See Figure 2.)

a. Using PWA 57790 or PWA 57535 pusher/puller, press sleeve bearings into convergent nozzle segment as follows:

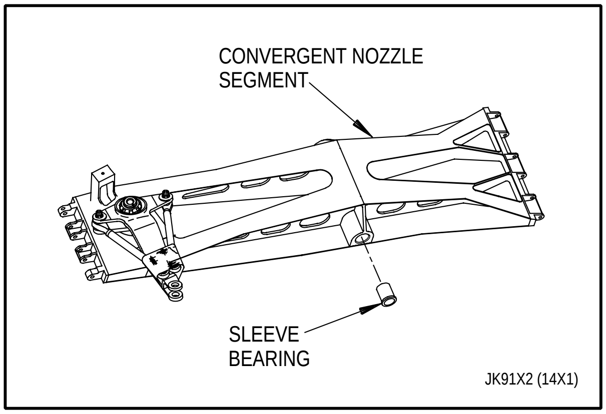


Figure 2. Augmentor Nozzle Segments - Assembly (Sheet 1 of 7)

(1) Install one sleeve bearing onto end of detail-8 guide.

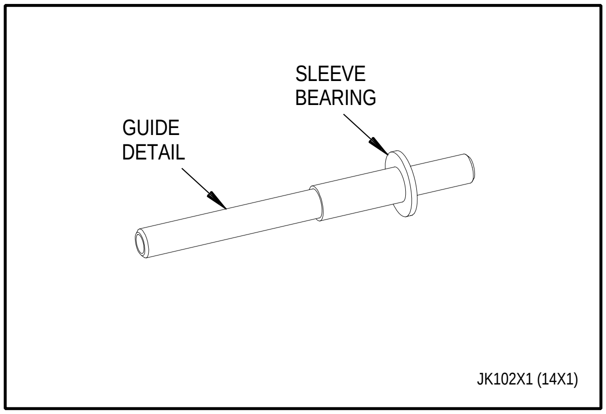


Figure 2. Augmentor Nozzle Segments - Assembly (Sheet 2 of 7)

(2) Install sleeve bearing and detail-8 guide into convergent nozzle segment.

(3) Slide other sleeve bearing onto other end of detail-8 guide.

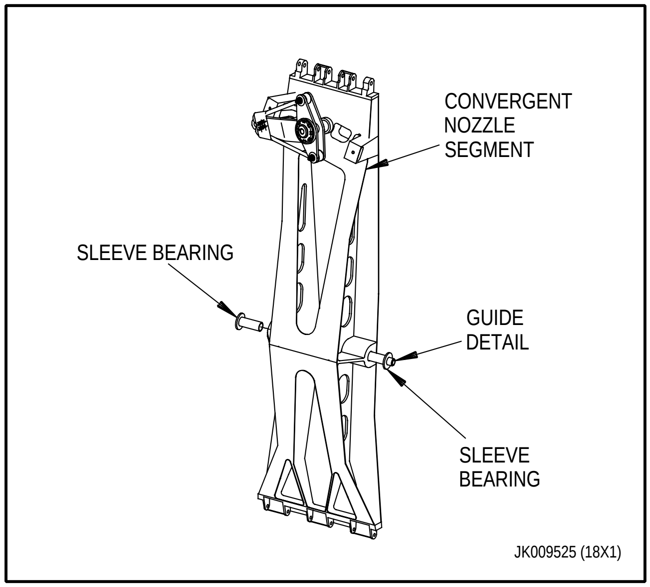


Figure 2. Augmentor Nozzle Segments - Assembly (Sheet 3 of 7)

(4) Insert small OD end of detail-9 spacer into thrust bearing of detail-4 cover assembly. Install detail-4 cover assembly and detail-9 spacer onto detail-1 ball screw. Do not remove cover assembly detail from ball screw detail.

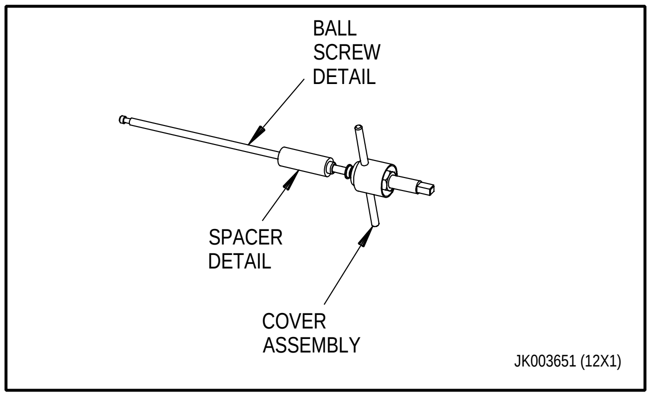


Figure 2. Augmentor Nozzle Segments - Assembly (Sheet 4 of 7)

(5) Insert detail-1 ball screw through detail-8 guide.

(6) Position detail-17 end cap assembly on end of detail-1 ball screw with thrust bearing of detail facing segment. Lock slider to engage groove in ball screw.

(7) Hold handle of detail-4 cover assembly and turn detail-1 ball screw assembly using
1/4 inch open end wrench to seat sleeve bearing.

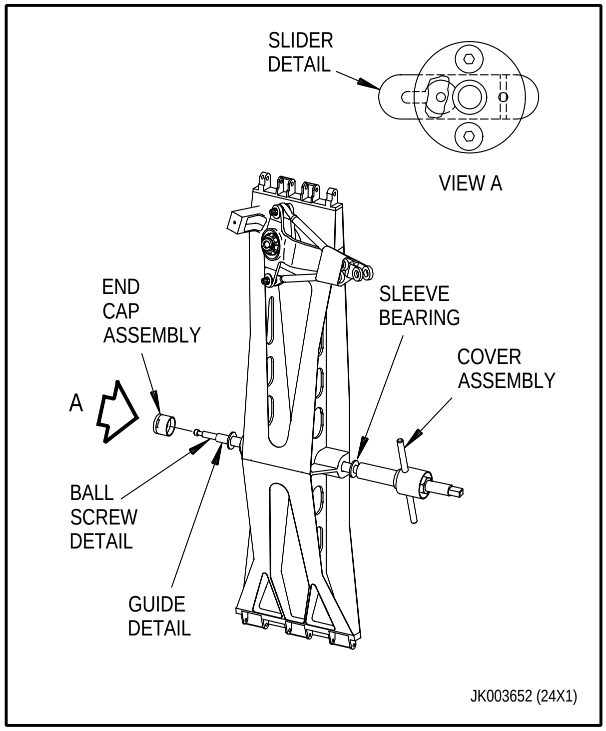


Figure 2. Augmentor Nozzle Segments - Assembly (Sheet 5 of 7)

b. Install convergent nozzle segment pin.

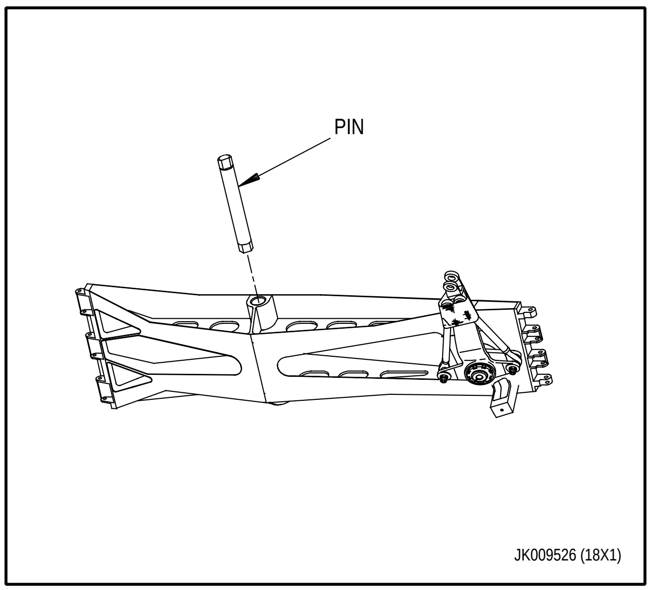


Figure 2. Augmentor Nozzle Segments - Assembly (Sheet 6 of 7)

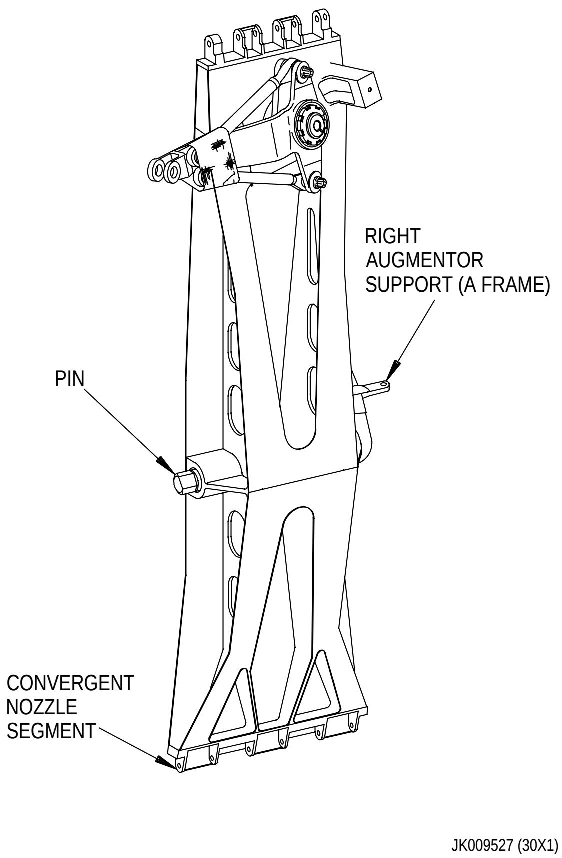


Figure 2. Augmentor Nozzle Segments - Assembly (Sheet 7 of 7)

c. Install pin into right augmentor support (A frame). Wire support to convergent nozzle segment.

4. FOLLOW-ON MAINTENANCE.

a. Install convergent nozzle segments on augmentor nozzle assembly. Refer to T.O. 2J-F100-53-10, WP 603 00.

WORK PACKAGE

TECHNICAL PROCEDURES

SEALS, AND CONVERGENT LINER, AUGMENTOR NOZZLE SEGMENT -

ASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	16	3	16	5	9
2	0	4	0	6	16

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, ANTIGALLING (PWA 36545)	EVERLUBE 382
TAPE, MASKING (CLOTH BACKING)(PMC 4001)	92T RED TUCK INDUSTRIES, INC. OR NO. 222 KENDALL CO. OR CC 150-01B RED J.B. PRATA, LTD. OR CP 1315 CHATFIELD PAPER CO.

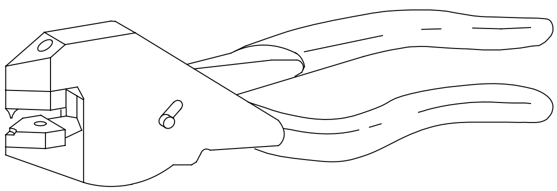
EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
PIN	4023966	15
RIVET	MLSP-M04-01	15
WASHER	4023967	15

APPLICABLE SUPPORT EQUIPMENT

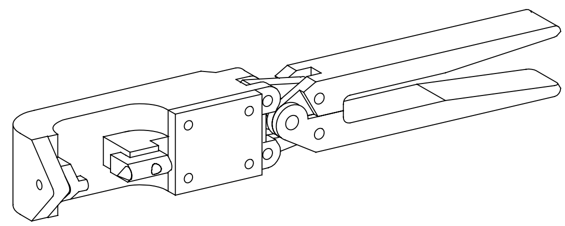
Paragraph	Function - Tool Nomenclature	Tool Number
2	AUGMENTOR NOZZLE SEGMENT SEALS AND CONVERGENT LINER - ASSEMBLY	
	INSTALLER, AUGMENTOR, SEAL HINGE PIN ----------	PWA 56570 OR
	RIVETER, AUGMENTOR SEAL HINGE PIN -----------	PWA 51762

ILLUSTRATED SUPPORT EQUIPMENT



PWA 51762 –C

Figure T1. PWA 51762 RIVETER



PWA 56570 –C

Figure T2. PWA 56570 INSTALLER

1. INTRODUCTION.

a. This work package contains instructions for assembly of the augmentor balance, convergent, and divergent nozzle segment seals; and augmentor convergent nozzle segment seal liner.

2. AUGMENTOR NOZZLE SEGMENT SEALS AND CONVERGENT LINER - ASSEMBLY.

(See Figure 1.)

a. Assemble convergent nozzle segment seal(5, figure 1) to balance nozzle segment seal(10) as follows:

(1) Place convergent seal(5) on bench, flat side down. Install hinge of balance seal(10), flat side down, into double hinged end of convergent seal.

(2) Apply PWA 36545 antigalling compound to hinge pins(9). Install one pin in each side of assembled hinge. Heads of hinge pins shall face inward.

NOTE

If binding exists or full operating range is not obtainable, it is permissible to grind or blend in area of restriction to gain relief.

(3) Inspect open to closed travel of balance and convergent segment seals to ensure full travel and freedom from binding and interference. Do not let angle between balance and convergent nozzle segment seals become less than 120 degrees.

(4) Position hinge pin lock(7) over hole in convergent seal(5) with wide part of lock between heads of pins(9).

(5) Install hinge pin lock(7). Secure hinge pin lock(7) using rivet(8); head location optional.

b. Tape augmentor divergent nozzle segment seal connecting links(11) onto divergent nozzle segment seal(1) together to prevent damage.

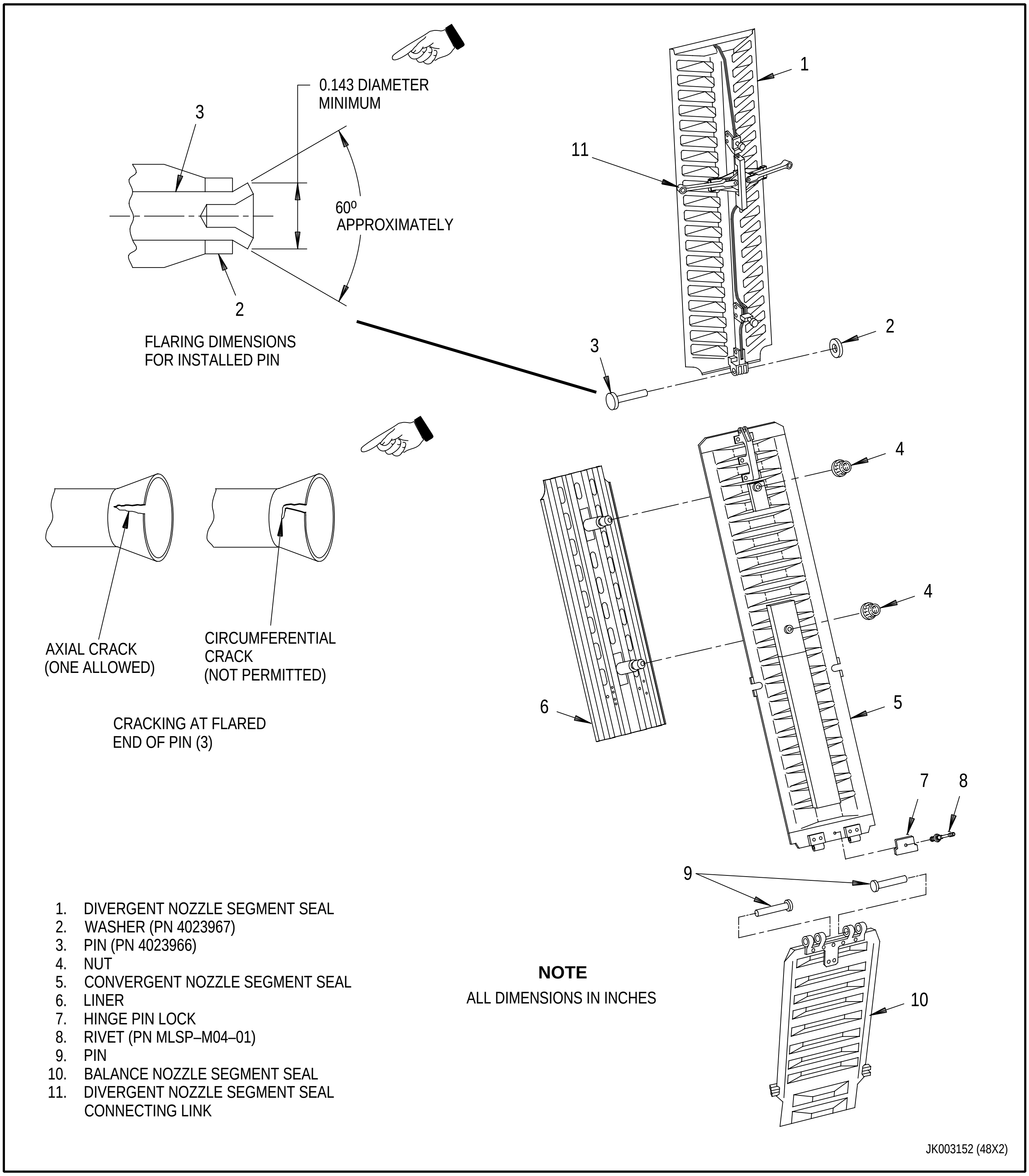


Figure 1. Augmentor Nozzle Segment Seals and Convergent Liner - Assembly

c. Assemble divergent nozzle segment seal(1) to convergent nozzle segment seal(5) as follows:

(1) Place convergent and balance seals flat side down on bench.

(2) Apply PWA 36545 antigalling compound to pin(3).

(3) Engage hinge of divergent seal(1) into hinge of convergent seal(5). Install pin(3) from either direction.

NOTE

If binding exists or full operating range is not obtainable, it is permissible to grind or blend in area of restriction to gain relief.

(4) Inspect open to closed travel of convergent and divergent seals to ensure full travel is maintained, seals do not bind, and there is no interference. Do not let angle between divergent and convergent nozzle segment seals become less than 150 degrees.

(5) Install washer(2) onto pin(3).

(6) Flare pin(3) per figure 1 using PWA 56570 installer.

NOTE

For PN 4023966 only, one axial crack is permitted. Circumferential cracking is not permitted.

(7) Inspect flared end of pin for cracks. If cracks are found, remove and replace pin(3).

d. Install liner(6) onto convergent seal(5) as follows:

NOTE

Augmentor convergent nozzle segment seal liner has an arrow pointing to its forward end. Upper ribs end approximately 1/2 inch from forward end of liner.

(1) Place liner(6) flat side down on bench.

(2) Install liner with forward end toward balance seal onto smooth side of convergent seal. Insert bolts through holes in convergent seal.

(3) Apply PWA 36545 antigalling compound to nut threads. Install nuts(4) and torque 27 to 30 pound-inches.

3. FOLLOW-ON MAINTENANCE.

a. Install augmentor nozzle segment seals on augmentor nozzle support per WP 603 00.

WORK PACKAGE

TECHNICAL PROCEDURES

AUGMENTOR NOZZLE ASSEMBLY -

ASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 32

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	21	10	11	23	11
2	0	11	0	24	0
3 - 4	11	12	21	25	7
5 - 6	0	13 - 17	0	26 Blank	9
7 - 8	11	18	9	27	9
9	0	19 - 22	0	28 - 32	0

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, ANTIGALLING (PWA 36545)	EVERLUBE 382
COMPOUND, ANTIGALLING (PWA 550)	HI-T 650 OR LUBRI-BOND HT

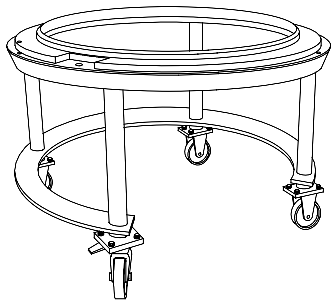
EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
LOCK, HINGE PIN	4072948	15
LOCK, SEGMENT COVER	4075973	30
LOCKNUT	4058231	30
PIN, COTTER	MS9245-25	5
WASHER, KEY	4024873	15
WASHER, KEY	4070358	30

APPLICABLE SUPPORT EQUIPMENT

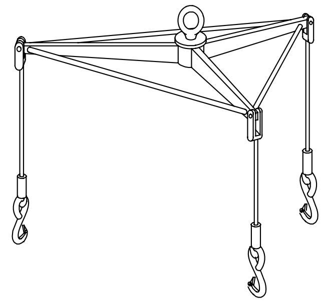
Paragraph	Function - Tool Nomenclature	Tool Number
2	AUGMENTOR NOZZLE SUPPORT - INSTALLATION INTO BUILD STAND	
	SUPPORT, BUILD STAND, AUGMENTOR NOZZLE FRONT FLANGE	PWA 55460
	STAND, AUGMENTOR DUCT AND NOZZLE MODULE BUILD	PWA 51120
	SLING, AUGMENTOR NOZZLE LIFTING	PWA 52644
	ADAPTER, LIFTING, VERTICAL HANDLING	PWA 52679
3	AUGMENTOR NOZZLE SYNCHRONIZING RING - INSTALLATION	
	SUPPORT, BUILD STAND, AUGMENTOR NOZZLE FRONT FLANGE	PWA 55460
	STAND, AUGMENTOR DUCT AND NOZZLE MODULE BUILD	PWA 51120
	ADAPTER, LIFTING, VERTICAL HANDLING	PWA 52679
	SLING, AUGMENTOR NOZZLE LIFTING	PWA 52644
	PIN SET, RIGGING	PWA 57701
7	DIVERGENT NOZZLE SEGMENT - INSTALLATION	
	WRENCH, HOLDING, AUGMENTOR NOZZLESUPPORT REAR NUT	PWA 53704

ILLUSTRATED SUPPORT EQUIPMENT



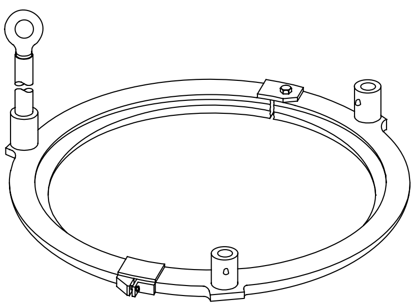
PWA 51120 –C

Figure T1. PWA 51120 STAND



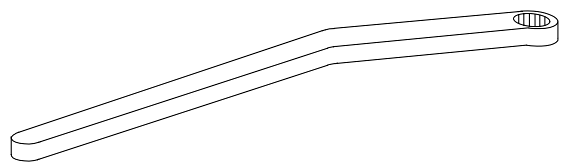
PWA 52644 –C

Figure T2. PWA 52644 SLING



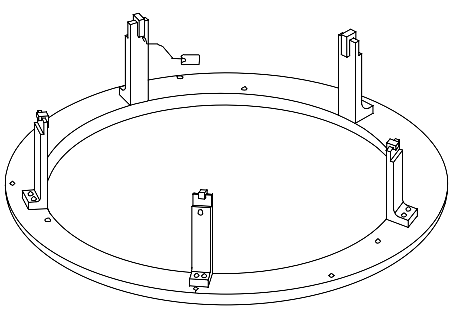
PWA 52679 –C

Figure T3. PWA 52679 ADAPTER



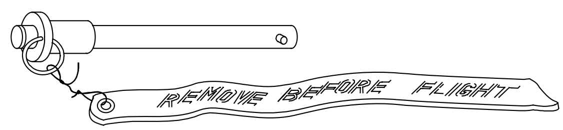
PWA 53704 –C

Figure T4. PWA 53704 WRENCH



PWA 55460 –C

Figure T5. PWA 55460 SUPPORT



PWA 57701 –C

Figure T6. PWA 57701 PIN SET

1. INTRODUCTION.

a. This work package contains instructions for assembly of the augmentor nozzle assembly.

2. AUGMENTOR NOZZLE SUPPORT - INSTALLATION INTO BUILD STAND.
(See Figure 1.)

a. Install PWA 55460 build stand support(3, figure 1) on PWA 51120 build stand(6). Secure support using support detail-4 screw assemblies(4).

b. Using hoist, attach PWA 52644 sling(1) to PWA 52679 lifting adapter(7).

c. Secure PWA 52679 lifting adapter to nozzle support assembly(2) as follows:

(1) Position adapter and sling over nozzle support.

(2) Open adapter so that it clears OD of nozzle support.

(3) Lower adapter onto front flange of nozzle support (Flange L).

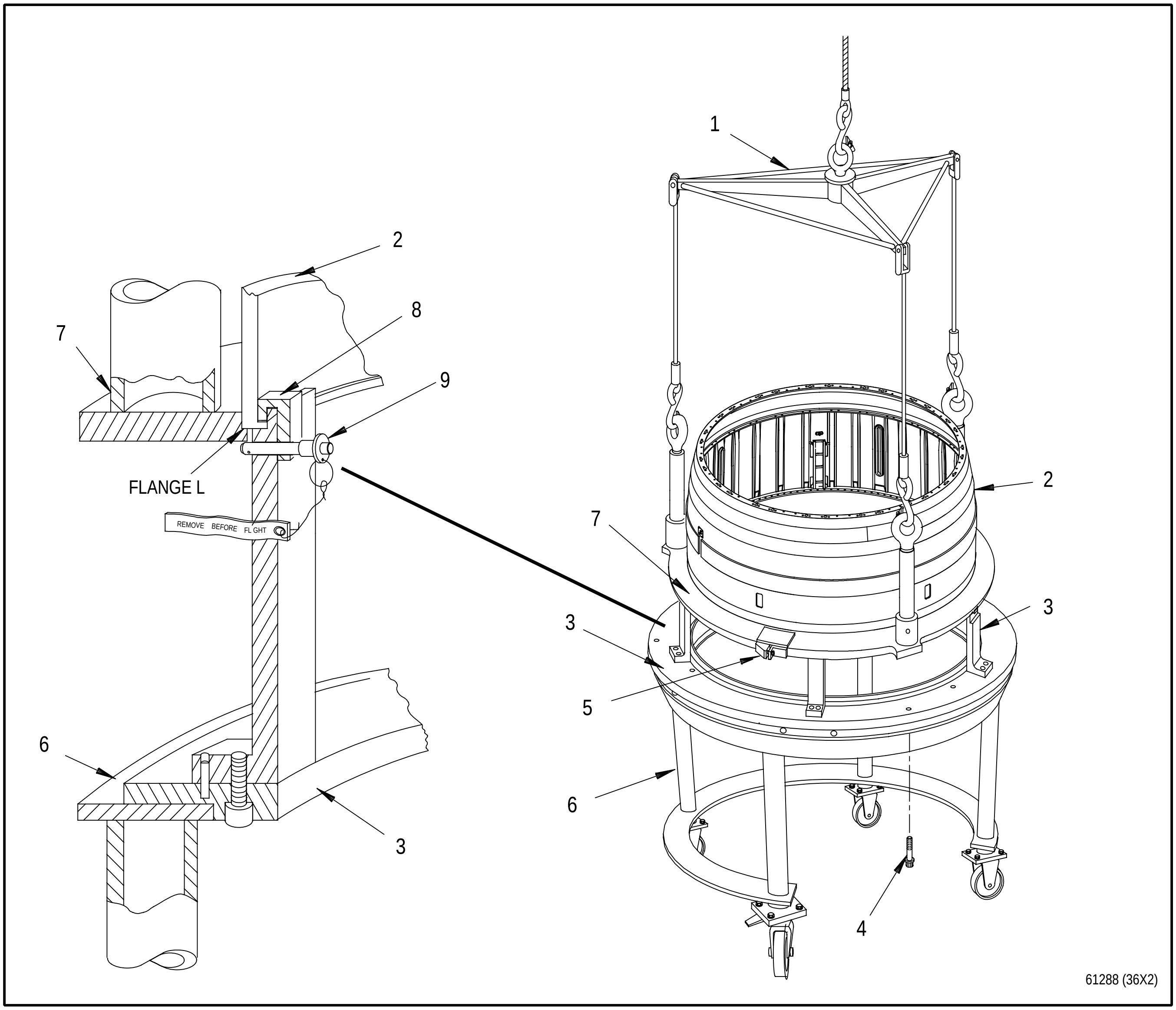
(4) Secure adapter using detail-10 swing bolt(5). Ensure that front flange of nozzle support sits on step of adapter.

d. If augmentor module build-up is planned, position synchronizing ring on PWA 55460 support and PWA 51120 build stand as described in paragraph 3.

e. Carefully lift nozzle support assembly, and position over PWA 55460 support and PWA 51120 build stand.

f. If necessary, loosen build stand support detail-6 clamps(8) in order to prevent interference with nozzle assembly.

g. Lower nozzle support assembly onto PWA 55460 build stand support. Secure nozzle support using detail-6 clamps(8). Ensure front flange of nozzle support (Flange L) sits on step of PWA 55460 support.



1. PWA 52644 Sling
2. Nozzle support
3. PWA 55460 Build stand support
4. Screw assembly detail
5. Swing bolt detail
6. PWA 51120 Build stand
7. PWA 52679 Lifting adapter
8. Clamp detail
9. PWA 57701 Rigging pin

Figure 1. Augmentor Nozzle Support - Installation Into Build Stand

3. AUGMENTOR NOZZLE SYNCHRONIZING RING - INSTALLATION.

(See Figure 2.)

a. Apply PWA 36545 antigalling compound to bearing tracks of nozzle support(1, figure 2).

b. Install synchronizing ring(10) with fifteen brackets on synchronizing ring facing up on PWA 55460 support and PWA 51120 build stand so that ring is centrally located with narrow edge down. Secure ring to stand using MS9226-05 lockwire.

c. Using PWA 52679 lifting adapter and PWA 52644 sling, install nozzle support(1) on PWA 55460 support and PWA 51120 build stand. Position synchronizing ring inside of support so that one of five clevis lugs and potentiometer lug, on bottom of synchronizing ring, align with appropriate opening in nozzle support. Align cam followers with bearing tracks of nozzle support.

d. Lift synchronizing ring up and position ring to nozzle support using PWA 57701 rigging pin set.

e. Install cam followers(11, figure 2) as follows:

(1) Apply PWA 36545 antigalling compound to studs on cam followers(11). Bearing of cam follower must be free from any lubricant.

(2) Install cam followers(11) adjacent to each other in synchronizing ring slotted lugs and bearing tracks of nozzle support.

(3) Install washer(2) and nut(3).

(4) Torque nuts(3) 45 to 55 pound-inches while holding cam follower studs with 5/32 inch hex wrench.

(5) Install cotter pins(4). If cotter pin holes do not align, advance nut a maximum of 30 degrees. Do not exceed 90 pound-inches torque.

f. Apply PWA 36545 antigalling compound to runners(7) and pin(9).

g. Install runners(7) onto each side of shorter arm on curved connecting links(8). U-channels of runners shall be away from and parallel to curved connecting link. Secure runners with pin(9).

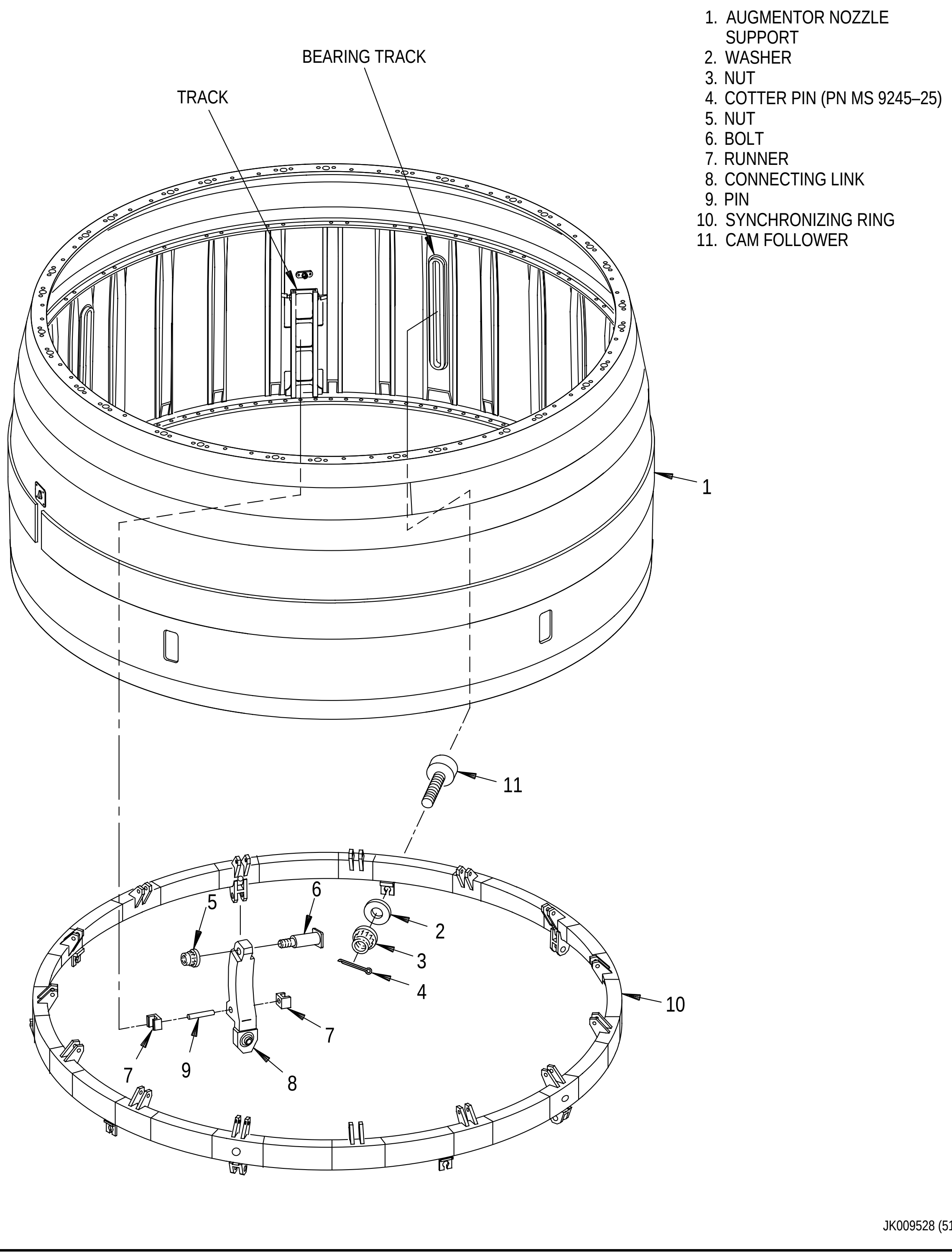


Figure 2. Augmentor Nozzle Synchronizing Ring - Installation

h. Install connecting link(8) as follows:

(1) Apply PWA 36545 antigalling compound to nut(5) and PWA 550 antigalling compound to shank of bolt(6).

(2) Install connecting link, bearing down, into tracks on nozzle support(1). Ensure that runners or pin do not drop out of connecting link. Secure long arm of link to synchronizing ring clevis using bolt(6), head to right, and nut(5).

(3) Torque nut(5) 62 to 72 pound-inches.

(4) Repeat procedure for four remaining connecting links.

i. Remove PWA 57701 rigging pin set securing synchronizing ring(10). Carefully lower ring to rest on bottom of bearing track.

4. AUGMENTOR BALANCE AND CONVERGENT NOZZLE SEGMENTS - ASSEMBLY.
(See Figure 3.)

a. Attach balance nozzle segment to convergent nozzle segment as follows:

(1) Engage hinges and position balance nozzle segment inward.

(2) Rotate segments to allow full engagement of hinge pin head.

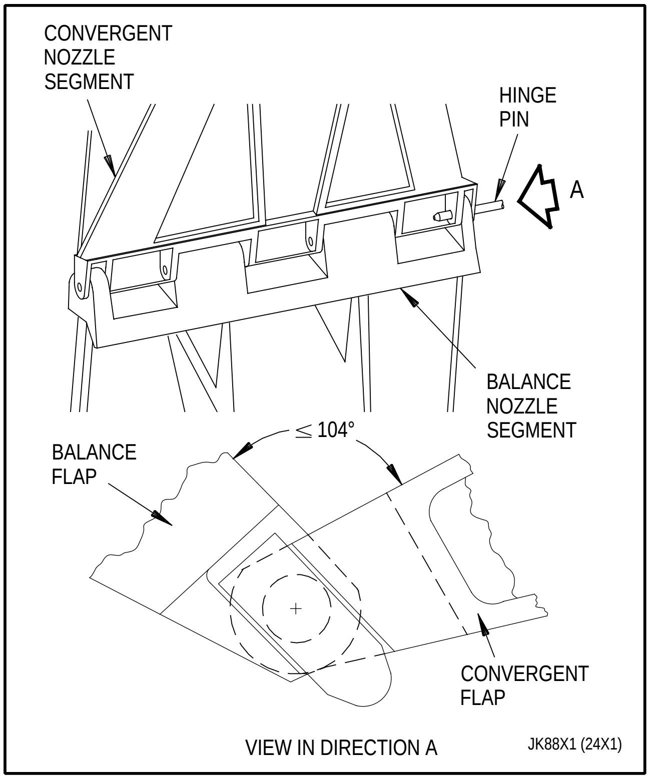


Figure 3. Augmentor Balance and Convergent Nozzle Segments - Assembly

(3) Install hinge pin. Using nonmetallic mallet and drift, tap hinge pin to seat.

(4) Check open-to-close travel of balance and convergent nozzle segments to ensure full travel and freedom from binding and interference.

b. Repeat procedure at remaining 14 locations.

5. CONVERGENT AND BALANCE NOZZLE SEGMENTS - INSTALLATION.
(See Figure 4.)

NOTE

Whenever nozzle linkage system is broken by removal of any connecting link, nozzle lever, convergent nozzle segment, or balance nozzle segment, all bolts securing augmentor nozzle supports (A frames) shall be loosened. Bolts shall be torqued at indicated steps during assembly to prevent binding.

a. Install left augmentor nozzle support (A frame) on mid flange and aft flange of nozzle support. Ensure pin holes in aft flange and support align.

b. Install pin into left support pin hole.

c. Lubricate nuts with PWA 36545 antigalling compound. Temporarily secure support to aft and mid flanges by installing nuts and bolts on lug side of support. Do not torque nuts.

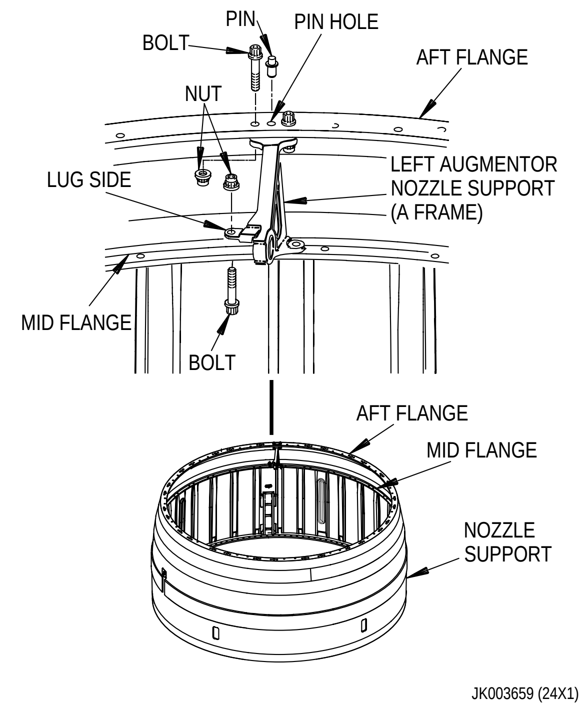


Figure 4. Convergent and Balance Nozzle Segments - Installation (Sheet 1 of 5)

d. Position connecting link on lug side of left support and install end of connecting link into clevis of synchronizing ring.

e. Apply PWA 36545 antigalling compound to threads of nut. Secure connecting link to synchronizing ring with bolt and nut per figure 4, sheet 2. Ensure bolt head engages locking feature on right side of synchronizing ring lug.

f. Torque nut 125 to 140 pound-inches. Temporarily secure connecting link to left support.

g. Repeat steps a. through f. for remaining locations.

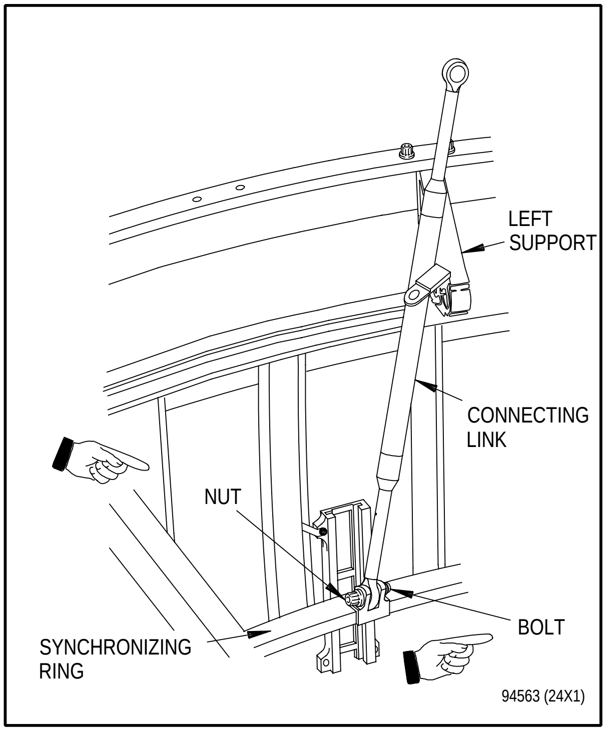


Figure 4. Convergent and Balance Nozzle Segments - Installation (Sheet 2 of 5)

NOTE

Right support should be wired to convergent nozzle segment.

h. Pivot left support outward. Install convergent segment by engaging pin into left support and rotating left support inward. Position right support on mid flange. Ensure pin holes in aft flange align with pin holes in left and right supports.

i. Install pin into right support pin hole.

j. Lubricate nuts with PWA 36545 antigalling compound. Temporarily secure right support to aft and mid flanges by installing nuts and bolts on lug side of support. Do not torque nuts.

k. Remove lockwire.

l. Repeat steps h., i., and j. for remaining locations.

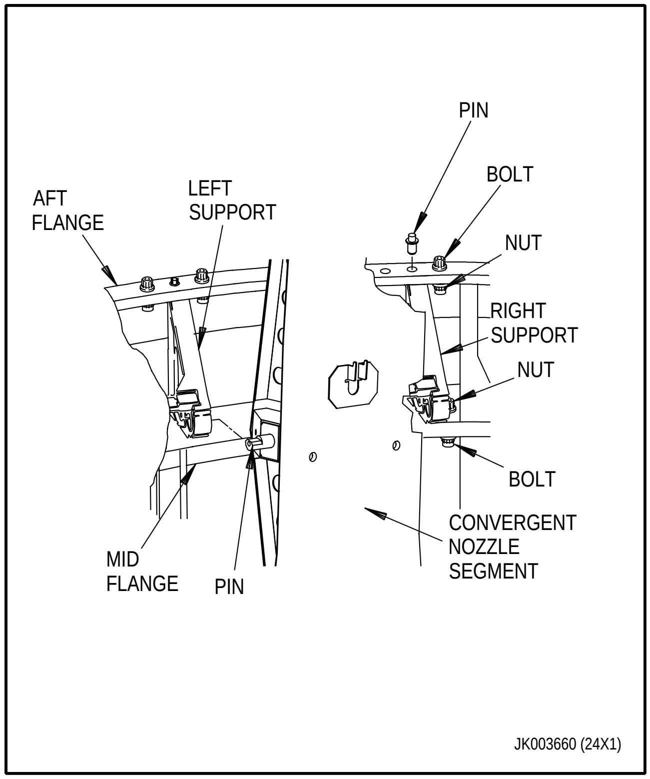


Figure 4. Convergent and Balance Nozzle Segments - Installation (Sheet 3 of 5)

m. Lubricate nuts with PWA 36545 antigalling compound and install nuts and bolts on inner side of supports. Then temporarily secure supports to each other with bolts, head down, and nuts. Do not torque nuts.

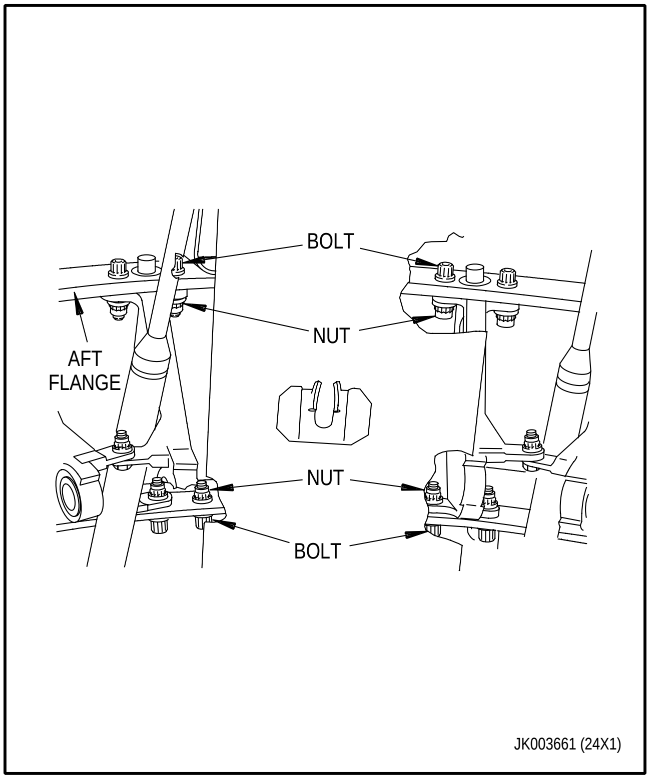


Figure 4. Convergent and Balance Nozzle Segments - Installation (Sheet 4 of 5)

NOTE

Only F-16 augmentor duct and nozzle modules have augmentor nozzle support seals.

n. If necessary, remove bolts and nuts from aft flange on lug side of supports. Install seal. Temporarily secure seal with bolts and nuts, fingertight.

o. Repeat steps m. and n. for remaining locations.

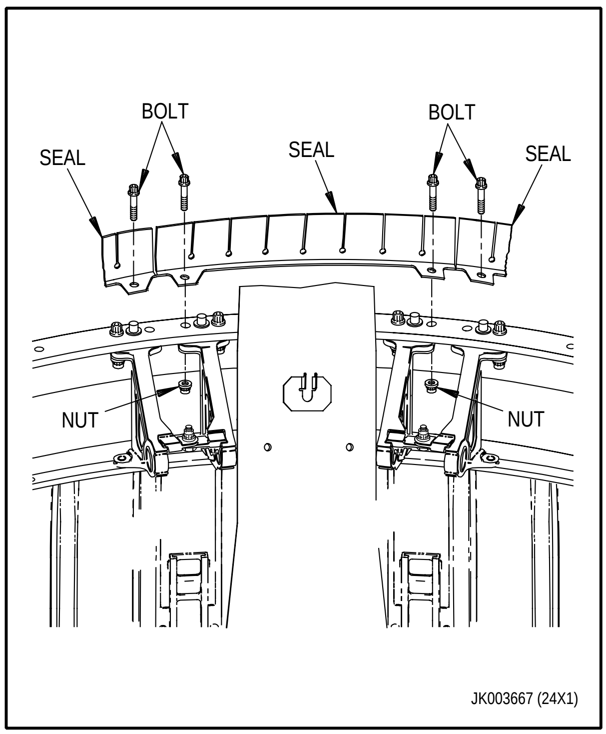


Figure 4. Convergent and Balance Nozzle Segments - Installation (Sheet 5 of 5)

6. AUGMENTOR NOZZLE SEGMENTS - SECURING CONNECTING LINKS.

(See Figures 5 and 6.)

NOTE

Whenever nozzle linkage system is broken by removal of any connecting link, nozzle lever, convergent nozzle segment, or balance nozzle segment, all bolts securing augmentor nozzle supports(3 and 7, figure 5) shall be loosened. Bolts shall be torqued at indicated steps during assembly to prevent binding.

a. If necessary, loosen bolts(1, 5, and 6) and nuts(2 and 4) securing augmentor nozzle supports(3 and 7).

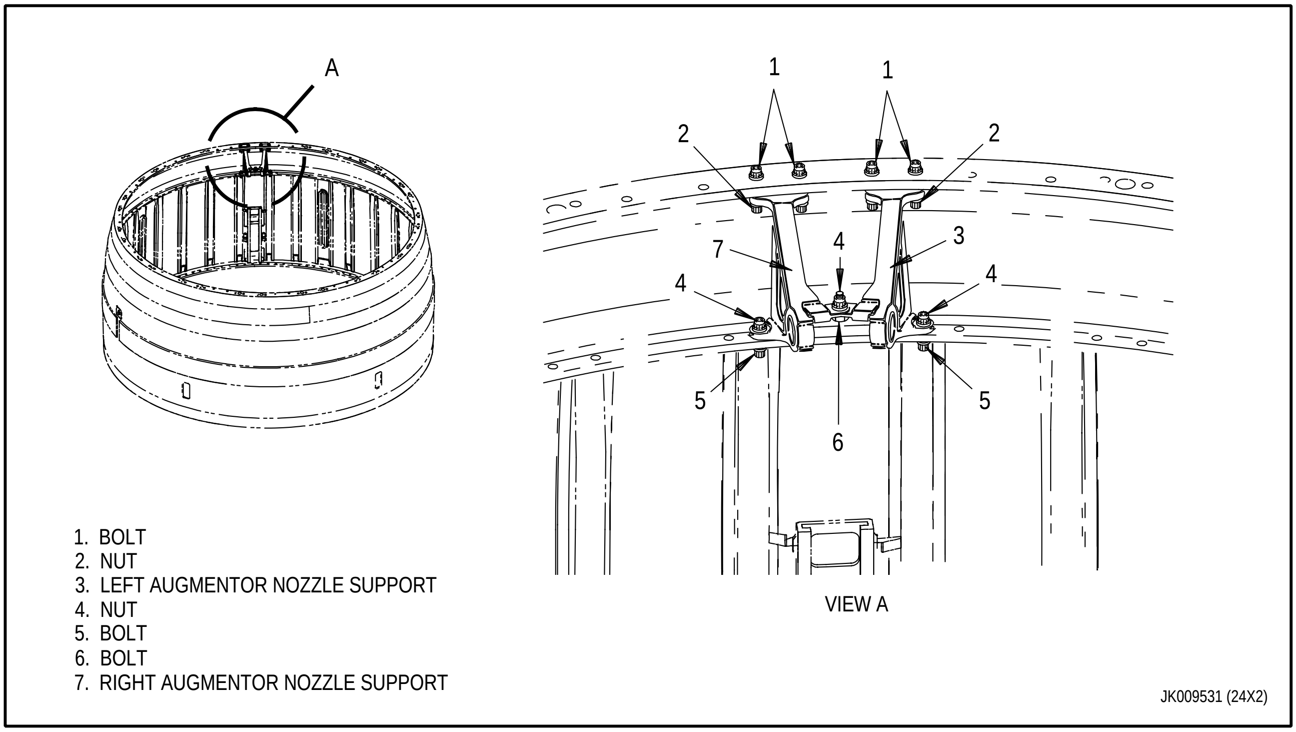


Figure 5. Augmentor Nozzle Segments - Loosening Augmentor Nozzle Support Bolts

b. Remove tape securing connecting links and pins to nozzle lever. Long arm of augmentor nozzle lever, as viewed from OD, shall be extended to left and upward.

NOTE

Upper connecting link attaches to left convergent nozzle segment. Lower connecting link attaches to right convergent nozzle segment.

c. Install augmentor nozzle rigid connecting links(2 and 10, figure 6) to adjacent augmentor convergent nozzle segments(4 and 14) as follows:

(1) Position upper connecting link(2) into segment cover(11) of adjacent left convergent nozzle segment(14).

(2) Align holes through segment cover and eye of connecting link. Install slotted pin(12).

CAUTION

Use of old key washers or improper bending will allow disengagement of attaching hardware and can result in nozzle fire during augmentation.

NOTE

Locks are installed from opposite side of segment covers for each convergent nozzle segment. Bent end of lock shall face in towards lever.

(3) Insert new lock(13), bent end up, through top of segment cover(11) and slotted pin(12). Spread legs of lock 180 degrees apart on bottom side of segment cover to secure connecting link(2).

(4) Install lower connecting link(10) into segment cover(7) of adjacent right convergent nozzle segment(4).

(5) Align holes through segment cover and eye of connecting link. Install slotted pin(6).

(6) Insert new lock(8), bent end down, through bottom side of segment cover(7) and slotted pin(6). Spread legs of lock 180 degrees apart on top side of segment cover to secure connecting link.

(7) Repeat substeps (1) through (6) for remaining segments.

(8) Install augmentor nozzle rigid connecting links(9, figure 6) onto long arm of augmentor nozzle lever(5). Apply PWA 36545 antigalling compound to nuts(3). Secure rigid connecting link with bolts(1), head inward, and nuts. Torque nuts 125 to 140 pound-inches.

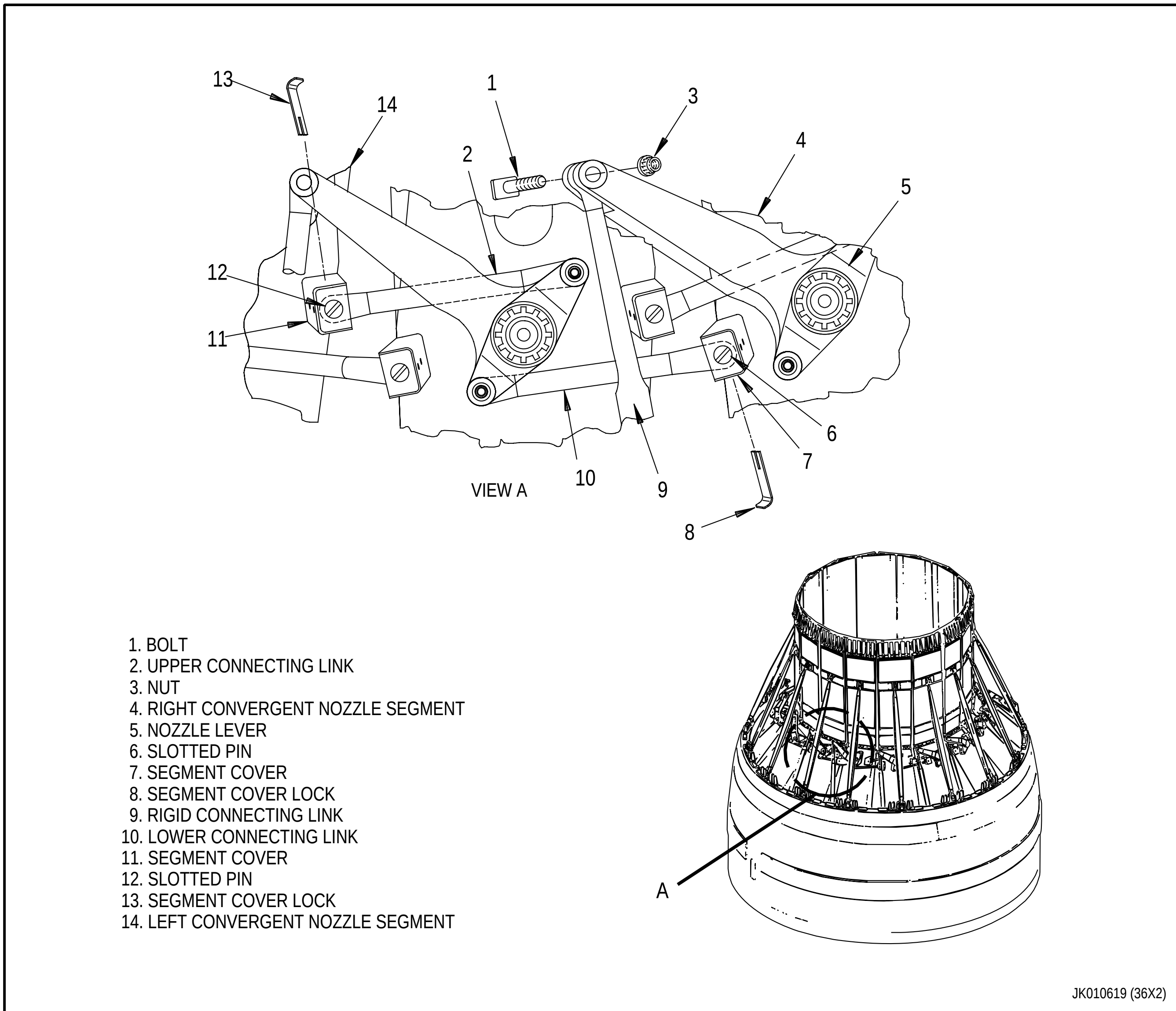


Figure 6. Augmentor Nozzle Rigid Connecting Links - Installation

7. DIVERGENT NOZZLE SEGMENT - INSTALLATION.
(See Figures 7 and 8)

a. Install augmentor divergent connecting link brackets and connecting links onto nozzle support as follows:

(1) Coat pin with PWA 36545 antigalling compound. Install augmentor divergent nozzle rigid connecting link between center vertical members of bracket. Insert pin.

(2) Apply PWA 36545 antigalling compound to nut. Position bracket on aft flange of nozzle support. Secure bracket with pin retainers, bolts, and nuts. Torque nuts 125 to 140 pound-inches.

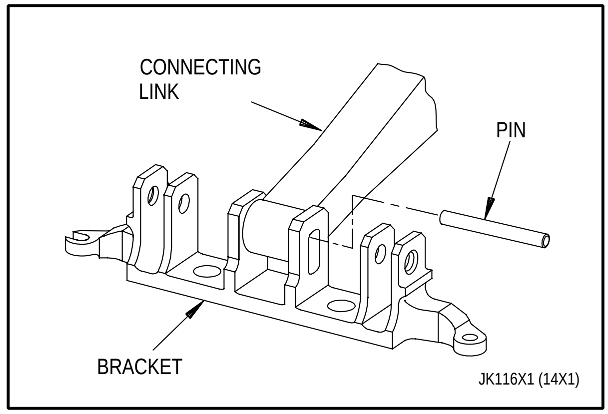


Figure 7. Divergent Nozzle Segment - Installation (Sheet 1 of 6)

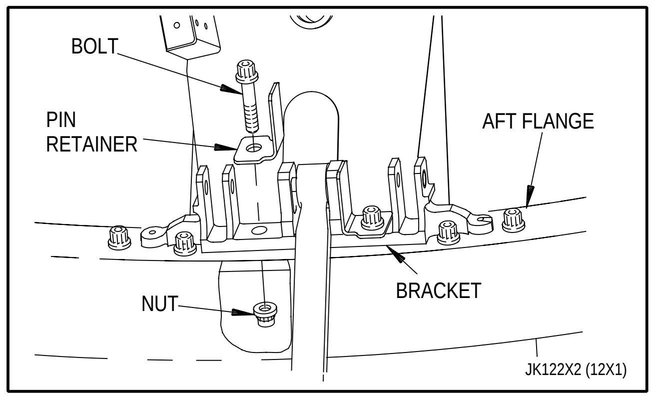


Figure 7. Divergent Nozzle Segment - Installation (Sheet 2 of 6)

CAUTION

Improper bending of new hinge pin lock or use of old hinge pin lock will allow disengagement of attaching hardware and may result in a nozzle fire during augmentation.

NOTE

Hinge pin is installed during installation of convergent nozzle segment liner. Hinge pin locks shall not be bent at this time.

b. Position divergent nozzle segment above convergent nozzle segment. Install new PN 4072948 hinge pin lock on right side of segment as shown. Engage standard (NSN 5120-00-24-61) 4 1/8 inch long, 0.156 inch diameter drive pin in hole in hinge and install pin. Move nozzle segment assembly and tap pin gently as necessary to install.

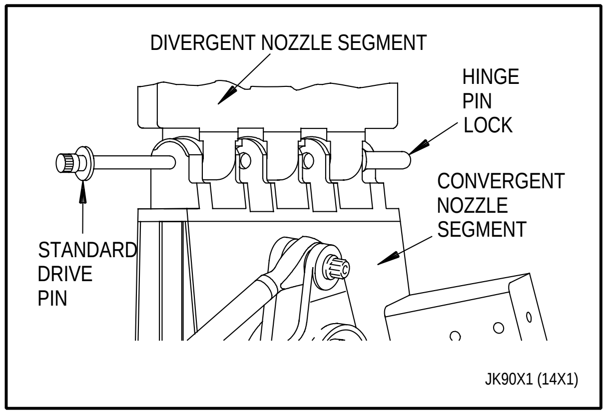


Figure 7. Divergent Nozzle Segment Installation (Sheet 3 of 6)

c. Attach connecting link to divergent nozzle segment as follows:

(1) Install free end of connecting link into lug on divergent segment.

(2) Apply PWA 36545 antigalling compound to shank of pin.

CAUTION

Use of old key washer or improper bending will allow disengagement of attaching hardware and can result in nozzle fire during augmentation.

(3) Install new PN 4024873 key washer.

NOTE

All pin heads shall face clockwise to enable easier and more accurate inspection. Nozzle assemblies shall not be disassembled only to satisfy this requirement.

(4) Install pin through lug, key washer, and connecting link, with head of pin facing clockwise.

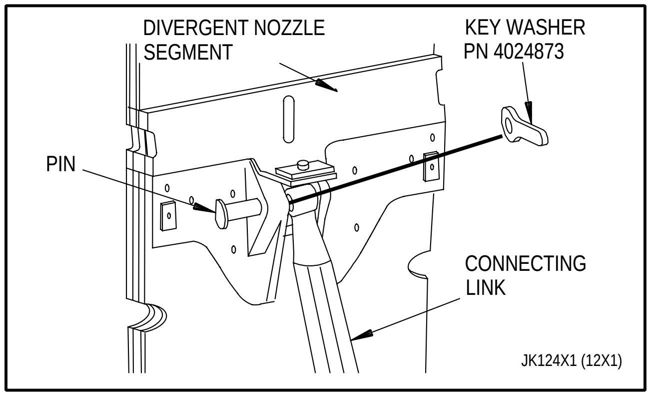


Figure 7. Divergent Nozzle Segment - Installation (Sheet 4 of 6)

NOTE

Two mechanics are needed for this operation; one to hold screwdriver, the other to bend key washer.

(5) Secure key washer as follows:

(a) Partially bend key washer, by hand, around lug.

(b) Insert flat tip of screw driver between lug on divergent segment and tab of key washer.

(c) Using nylon drift and nylon mallet, bend key washer against head of pin. Maximum gap between key washer and head of pin shall not exceed 0.020 inch.

(d) With key washer rotated to extreme position in either direction, tab of key washer shall extend to center of pin, or beyond. Verify proper installation of key washer.

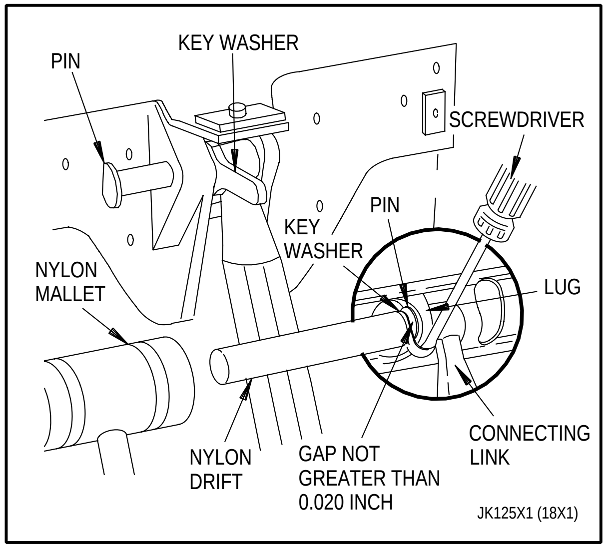


Figure 7. Divergent Nozzle Segment - Installation (Sheet 5 of 6)

(6) Ensure clearance between connecting link bracket and connecting link pin retainer is within 0.000 inch to 0.020 inch.

d. Repeat steps a. through c. for remaining connecting links.

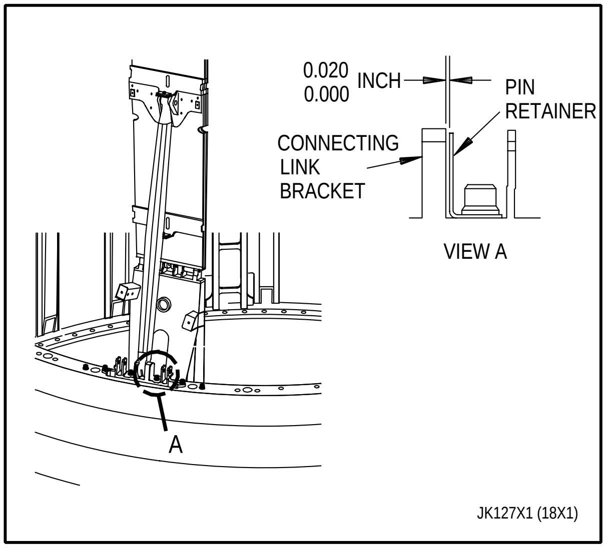


Figure 7. Divergent Nozzle Segment - Installation (Sheet 6 of 6)

e. Hold bolts(6, figure 8), securing nozzle supports(4 and 7) to each other, torque nuts(5) 27 to 30 pound-inches.

f. Torque bolts(1, figure 8) securing nozzle supports(4 and 7) to aft flange as follows:

(1) Ensure that pins(3) are seated in aft flange.

NOTE

- Only F-16 augmentor duct and nozzle modules have augmentor nozzle support seals(2).
- PWA 53704 wrench is required only if seals were installed.

(2) If seals(2) were installed, seals shall be positioned radially outward. Torque bolts(1) as follows:

(a) Loosen bolt(1) and position seal(2) radially outward as far as possible. Use PWA 53704 wrench to hold nuts(9) and torque bolts(1) 62 to 72 pound-inches.

(3) If seals(2) were not installed, hold nuts(9) and torque bolts(1) 62 to 72 pound-inches.

g. Hold bolts(10) securing nozzle supports(4 and 7) to mid flange and torque nuts(8) 27 to 30 pound-inches.

h. Manually operate nozzle through full operating range to verify freedom of movement.

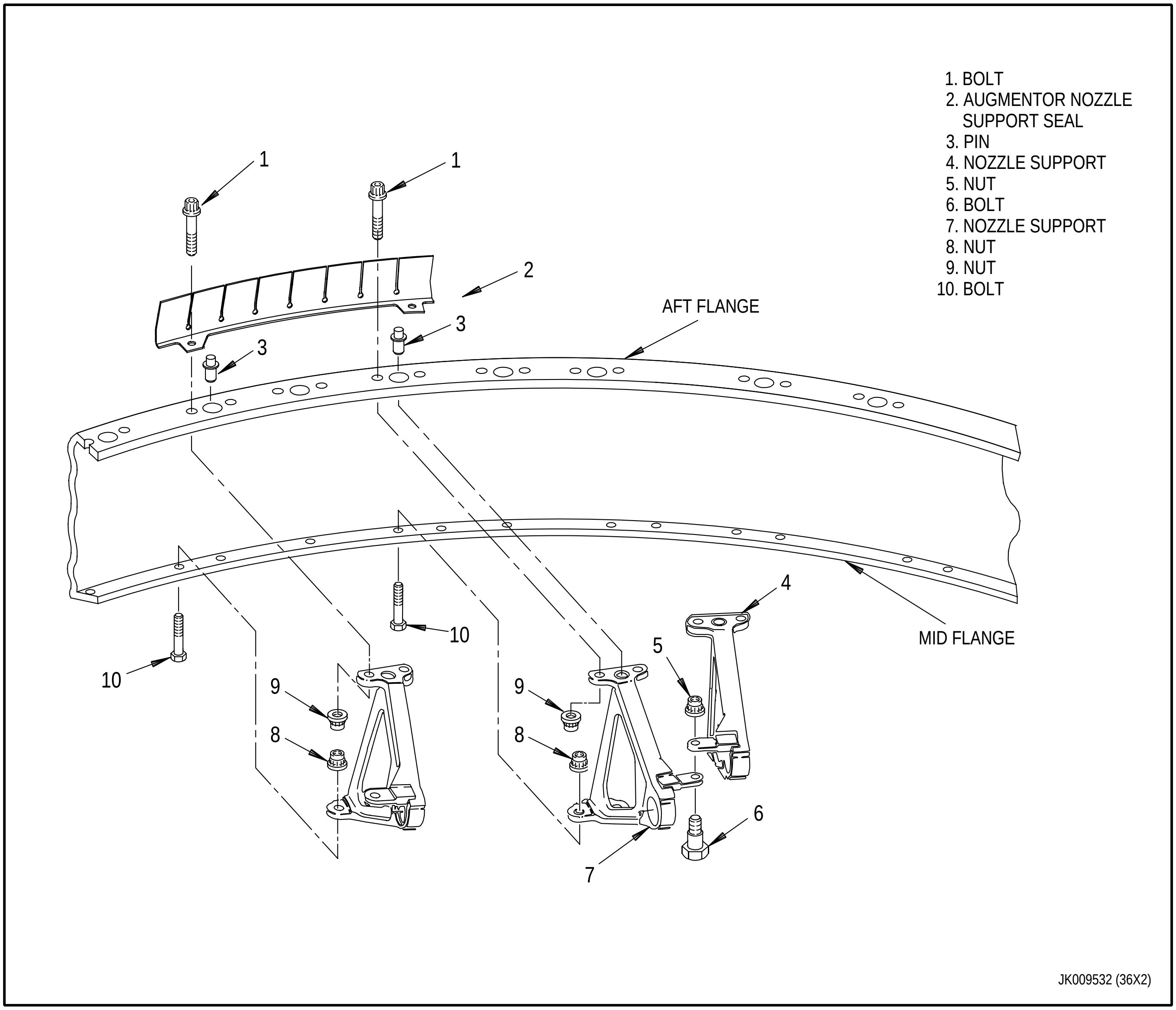


Figure 8. Augmentor Nozzle Segments - Securing Augmentor Nozzle Supports

Figure 9. Deleted

8. AUGMENTOR NOZZLE SEGMENT SEALS - INSTALLATION.

(See Figure 10.)

NOTE

Balance nozzle segment seal, convergent nozzle segment seal, and divergent nozzle segment seal are installed as an assembly.

a. Install seals into nozzle supports as follows:

(1) Remove tape securing connecting links of divergent seal. Install connecting links(11, figure 10) into side openings of adjacent divergent segments.

(2) Position new key washer(3) on outer face of divergent segment. Align key washer hole with divergent segment hole.

(3) Apply PWA 36545 antigalling compound to pin(4). Install connecting link(11) of divergent seal(12) into adjacent divergent segment(1). Align holes and install pin through key washer(3) divergent segment, and connecting link.

(4) Rotate pin to position pin head under divergent segment locking lug(2).

(5) Bend tabs of key washer(3) against sides of pin(4). Maximum gap between tabs of key washer and sides of divergent segment locking lug shall not exceed 0.020 inch.

b. Install 14 remaining segment seal assemblies.

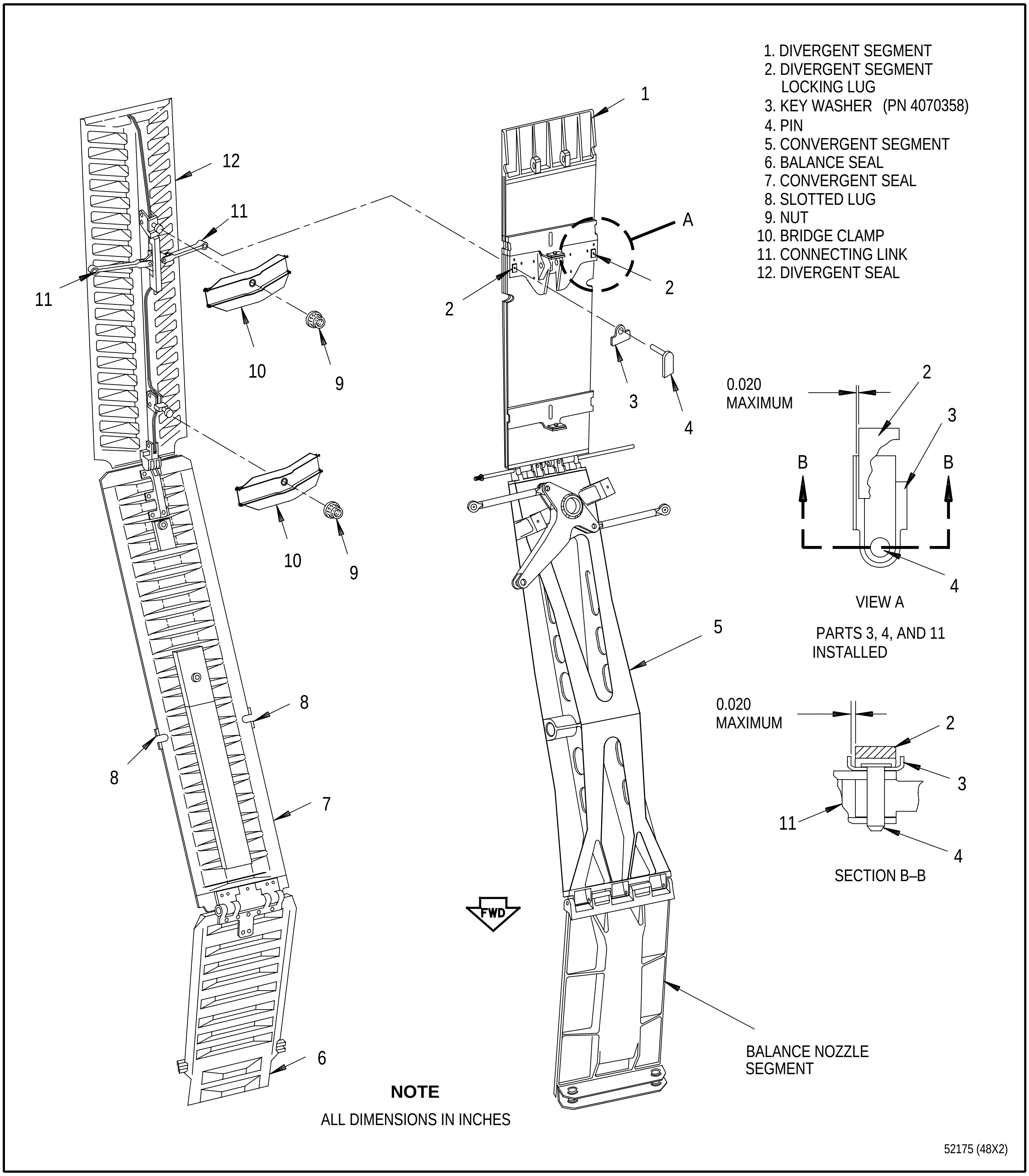


Figure 10. Augmentor Nozzle Segment Seal - Installation

9. AUGMENTOR CONVERGENT NOZZLE SEGMENT LINER - INSTALLATION.
(See figure 10 and Figure 11.)

a. Install liner(5, figure 11) (single lug end up and outward) into convergent nozzle segment(4). Engage tab on inward side of convergent segment with rib on outer side of liner.

b. Check for right or left movement at lower end of liner to assure rib of liner is engaged in tab of convergent segment. If necessary, apply pressure at center point.

c. Install single lug of liner(5) into center lug of hinge on convergent segment. Align pin holes.

d. Install hinge pin(2) into hinge pin lock(3) as follows:

(1) Apply PWA 36545 antigalling compound to hinge pin.

(2) Position hinge pin through lugs of divergent and convergent segments per figure 11. Ensure tab of hinge pin lock passes through head of pin.

(3) Bend tab of hinge pin lock. See figure 11.

(4) Manually cycle nozzle from closed to open and back to closed position to check for freedom of movement. After check, nozzle shall be left in closed position.

e. Install aft and forward bridge clamps(10, figure 10). Secure with nuts(9).

f. Torque nuts(9) 54 to 60 pound-inches.

g. Manually cycle nozzle through full operating range to closed position to check for freedom of movement.

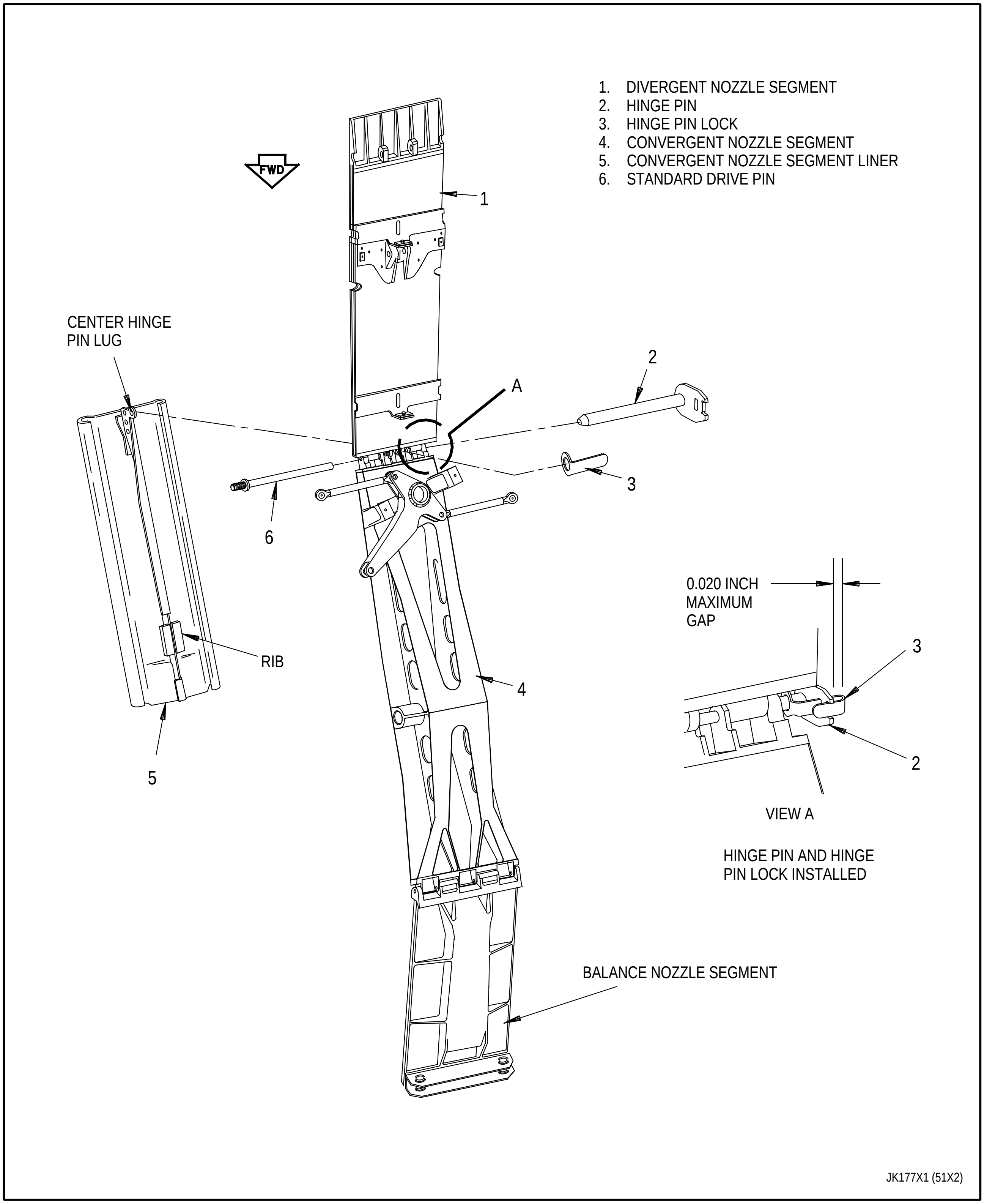


Figure 11. Augmentor Nozzle Segment Liner - Installation

10. AUGMENTOR BALANCE NOZZLE SEGMENTS CONNECTING LINKS - ASSEMBLY.
(See Figure 12.)

a. Install balance nozzle segment rigid connecting links into balance nozzle segments as follows:

(1) If necessary, install spherical bearing into each end of connecting link. Reference WP 329 00.

(2) Install connecting link in left side opening at lower end of balance segment.

(3) Secure connecting link with bolt, head down, and new locknuts.

(4) Torque bolts 140 to 160 pound-inches. A minimum of 35 pound-inches of run-on torqued is required on locknuts. If run-on torque is not met, replace locknut. Threads of bolt shall protrude through nut.

b. Repeat procedure at remaining 14 locations. Ensure augmentor balance nozzle section interconnecting hardware is properly installed.

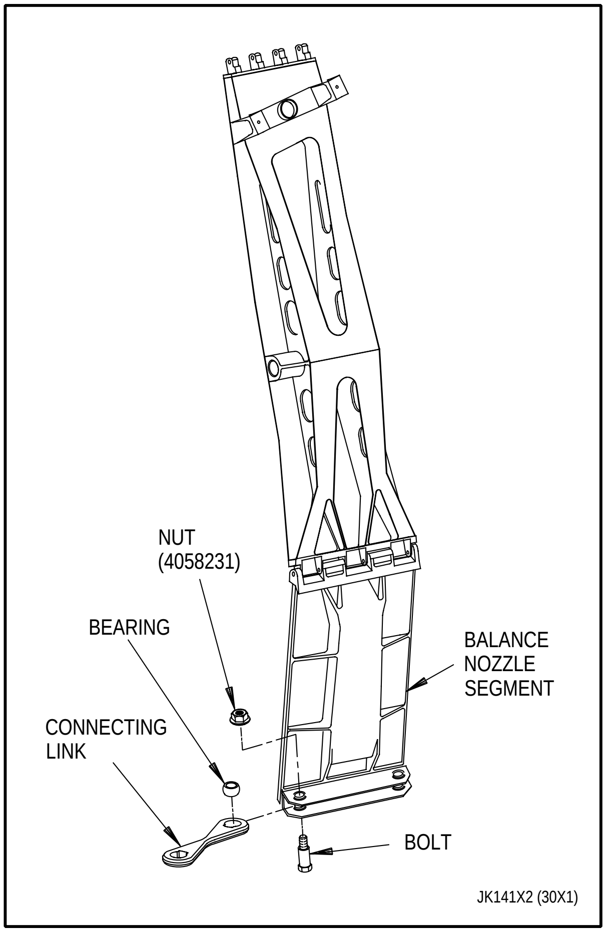


Figure 12. Augmentor Balance Nozzle Segments and Connecting Links - Assembly (Sheet 1 of 2)

c. Attach balance nozzle segments(1, figure 12, sheet 2) as follows:

(1) Install connecting link(3) inside opening at lower end of adjacent balance segment. Secure connecting link with bolt(2), head down, and new locknut(5).

(2) Torque bolts 140 to 160 pound-inches. Threads of bolt shall protrude through nut. A minimum of 35 pound-inches of run on torque is required on locknuts(5). If minimum run-on torque is not met, replace locknut.

(3) Repeat procedure at remaining 14 locations.

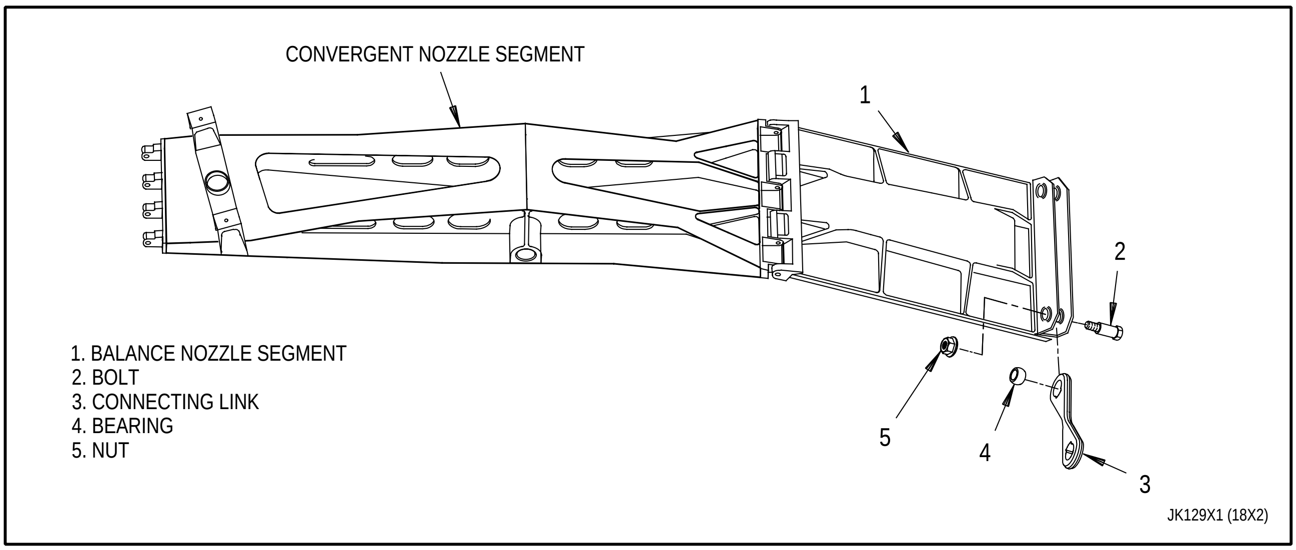


Figure 12. Augmentor Balance Nozzle Segments and Connecting Links - Assembly (Sheet 2 of 2)

11. FOLLOW-ON MAINTENANCE.

a. Install augmentor nozzle assembly on augmentor duct and nozzle module per WP 701 00.

WORK PACKAGE

INTRODUCTION

AUGMENTOR DUCT AND NOZZLE MODULE -

FINAL ASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	0				

1. INTRODUCTION.

a. This work package introduces the 700 00 through 799 00 series of work packages for final assembly of the augmentor duct and nozzle module parts. The following work packages are included in this series:

WP No.	Title
701 00	Augmentor Duct and Nozzle Module - Assembly
702 00	Augmentor Convergent Nozzle Area-Sizing
703 00	Augmentor Convergent and Divergent Nozzle - Functional Check
704 00 through 799 00	Open

WORK PACKAGE

TECHNICAL PROCEDURES

AUGMENTOR DUCT AND NOZZLE MODULE -

ASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 38

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	23	18	4	32	4
2	11	18A	12	33	23
3	23	18B Blank Added	4	34	9
4	16	19 - 30	0	35	11
5 - 16	0	31	1	36 Blank	0
17	6				

REFERENCE MATERIAL REQUIRED

Title	Number
Augmentor Duct and Nozzle Module	T.O. 2J-F100-53-10
Augmentor Convergent Nozzle Area Sizing	WP 702 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T. O. No.	Date	Level	Title (ECP No.)
2J-F100(IV)-544	30 AUG 91	I	Installation of Redesigned Augmentor Combustion Chamber Assembly, F100-PW-229 Augmentor Module, F100-PW-229 Engines

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ACETONE (PMC 9008)	O-A-51
ADHESIVE/SEALANT, SILICONE RUBBER	RTV 116
ALCOHOL, ISOPROPYL (PMC 9094)	TT-I-735
CHEESECLOTH, UNSIZED	PWA GA 100-11 OR CCC-C440
CLOTH, LINT FREE	-
COMPOUND, ANTIGALLING (PWA 36545)	EVERLUBE 382
COMPOUND, ANTIGALLING (PWA 550)	HI-T-650 OR LUBRI-BOND HT
LOCKWIRE(0.020 INCH DIAMETER)	MS9226-02
LOCKWIRE(0.032 INCH DIAMETER)	MS9226-04
OIL, LUBRICATING	MIL-L-7808
PENCIL (CRAYON), SILVER, METAL MARKING (HARD) (PMC 4059-7)	COLORBRITE NO. 2101
PETROLATUM (PMC 9609)	VV-P-236

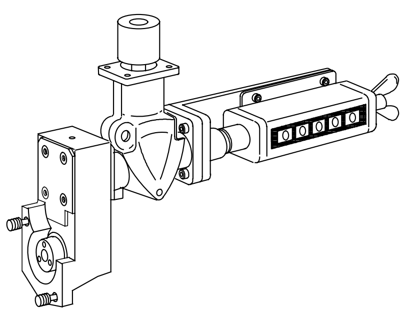
EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
GASKET	2084693	1
PIN, COTTER	MS9245-24	45
PIN, COTTER	MS9245-28	5
WASHER, KEY	4052098	10

APPLICABLE SUPPORT EQUIPMENT

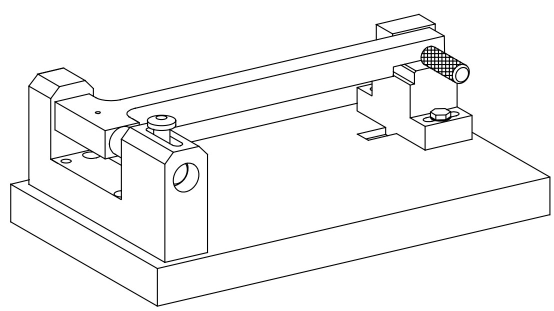
Paragraph	Function - Tool Nomenclature	Tool Number
3	AUGMENTOR NOZZLE ASSEMBLY - INSTALLATION	
	ADAPTER, LIFTING, AUGMENTOR NOZZLE FRONT FLANGE VERTICAL ONLY	PWA 52679
	SLING, AUGMENTOR NOZZLE LIFTING	PWA 52644
	GUIDE, AUGMENTOR BALANCE SEGMENTS TO DUCT FINGER SEALS	PWA 52681
	STAND, INLET/FAN MODULE, STORAGE AND DISASSEMBLY	PWA 56338
4	AUGMENTOR COMBUSTION CHAMBER LINER - INSTALLATION	
	CHECKING FIXTURE, AUGMENTOR CONVERGENT NOZZLE ACTUATOR	PWA 51758
7	AUGMENTOR EXTERNAL NOZZLE SEGMENTS - INSTALLATION	
	TORQUE ADAPTER, PRIMARY CONVERGENT NOZZLE BALLSCREW ACTUATOR, TURN AND COUNT	PWA 51757 OR
	ADAPTER, AUGMENTOR NOZZLE ACTUATOR DRIVE	PWA 56639

ILLUSTRATED SUPPORT EQUIPMENT



PWA 51757 –C

Figure T1. PWA 51757 TORQUE ADAPTER



PWA 51758 –C

Figure T2. PWA 51758 CHECKING FIXTURE

ILLUSTRATED SUPPORT EQUIPMENT (continued)

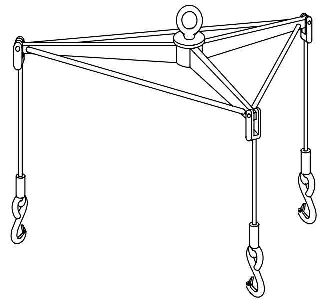


Figure T3. PWA 52644 SLING

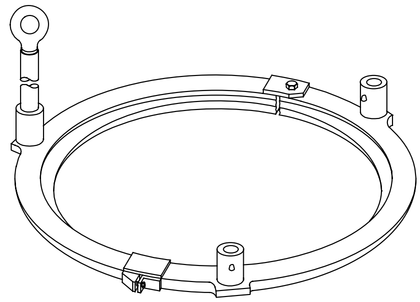


Figure T4. PWA 52679 ADAPTER

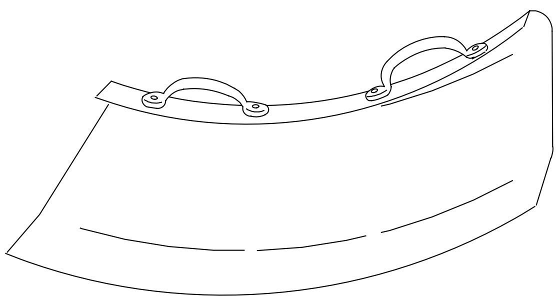


Figure T5. PWA 52681 GUIDE

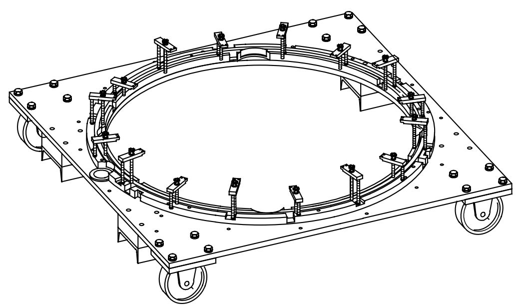


Figure T6. PWA 56338 STAND

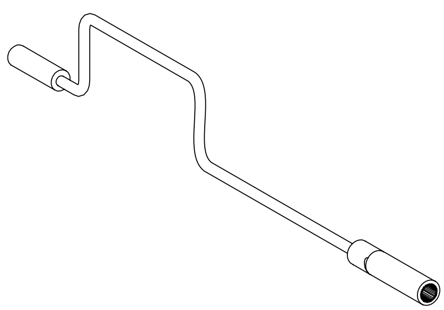


Figure T7. PWA 56639 ADAPTER

1. INTRODUCTION.

a. This work package contains instructions for assembly of the augmentor duct and nozzle module.

b. Assembly is done with the module vertical and in a front end down position.

2. AUGMENTOR FINGER VALVE - INSTALLATION.
(See Figure 1.)

a. Place augmentor finger valve cover on bench. Place finger valve spring on cover. Align offset holes.

b. Place finger valve spacer on spring. Align offset holes.

c. Apply PWA 550 antigalling compound to screws.

d. Install screws and torque 8 to 12 pound-inches.

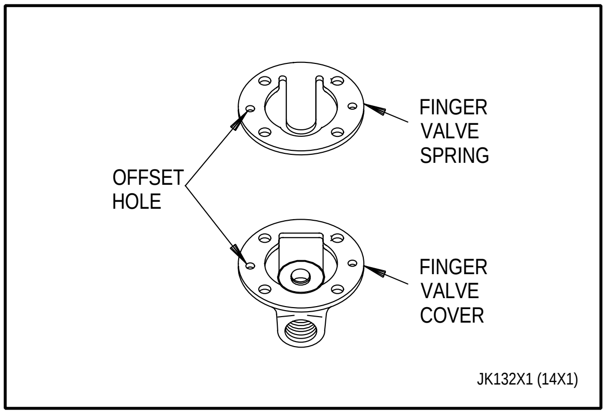


Figure 1. Augmentor Finger Valve - Installation (Sheet 1 of 4)

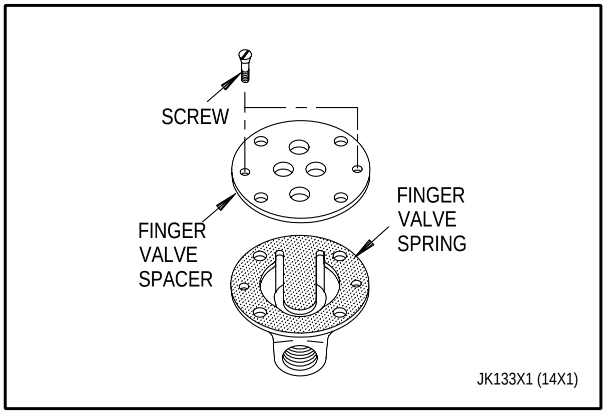


Figure 1. Augmentor Finger Valve - Installation (Sheet 2 of 4)

e. Install finger valve assembly onto studs of augmentor combustion chamber duct.

f. Apply PWA 36545 antigalling compound to nuts.

g. Install washers, bracket, and nuts onto studs of duct. Torque nuts 23 to 26 pound-inches.

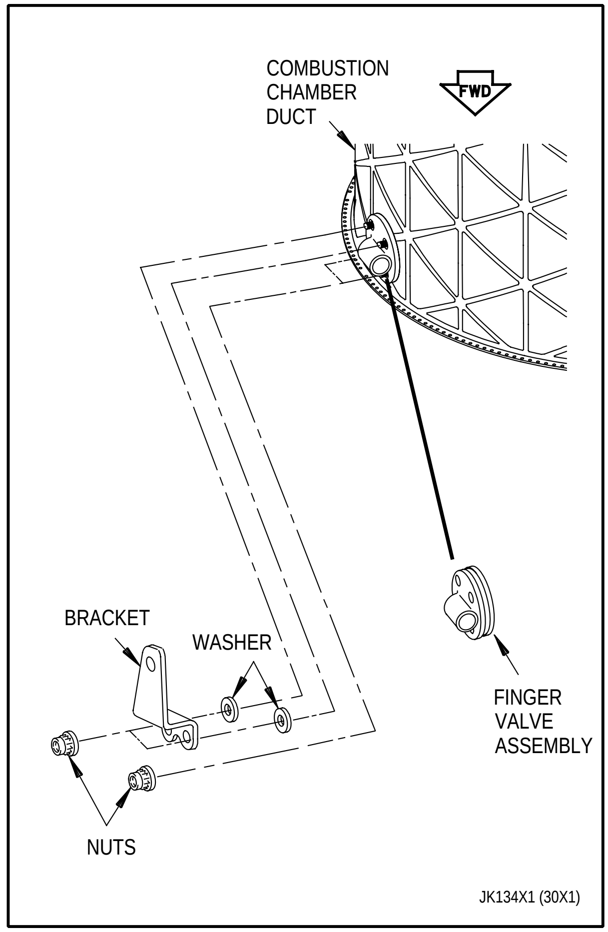


Figure 1. Augmentor Finger Valve - Installation (Sheet 3 of 4)

h. Lubricate threads of adapter with MIL-L-7808 oil. Install PN 2084693 gasket and adapter into finger valve assembly. Torque adapter 90 to 100 pound-inches.

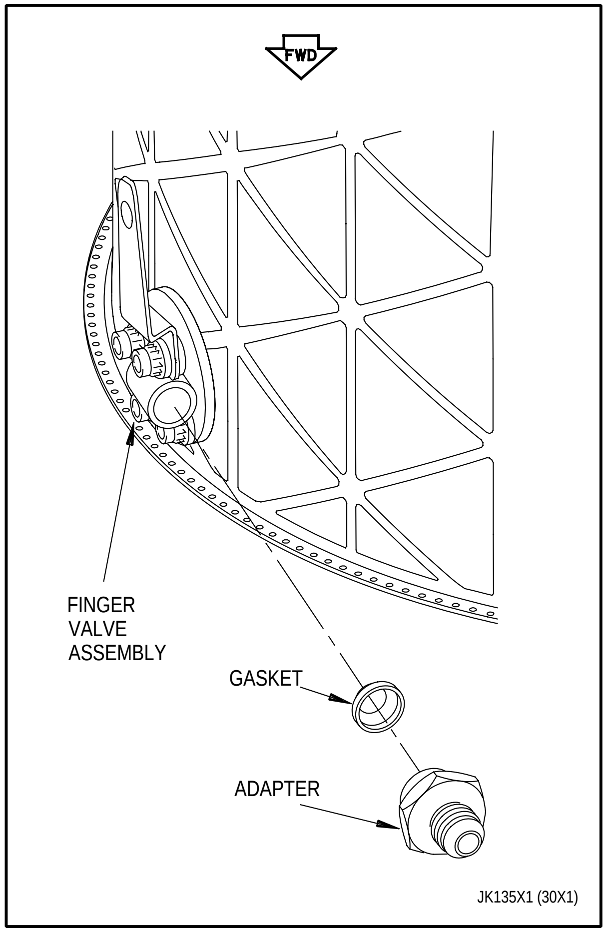


Figure 1. Augmentor Finger Valve - Installation (Sheet 4 of 4)

3. AUGMENTOR NOZZLE ASSEMBLY - INSTALLATION.

(See Figures 2 and 3.)

NOTE

- Finger valve assembly is located at 6 o’clock position.
- Offset hole is the 4th hole clockwise from 12 o’clock boss.

a. Place augmentor combustion chamber duct, large diameter facing up, on flat piece of wood. Mark offset hole.

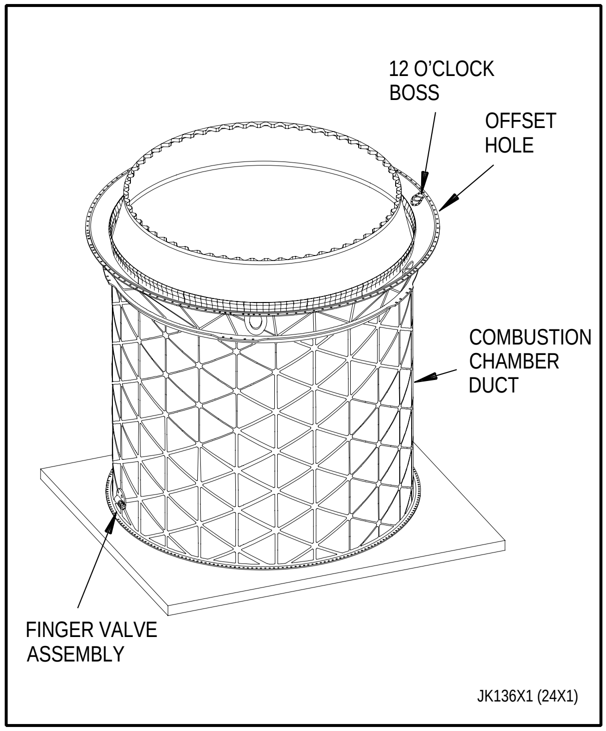


Figure 2. Augmentor Nozzle Assembly - Installation (Sheet 1 of 9)

NOTE

Nozzle assembly rests on PWA 55460 support and PWA 51120 build stand.

b. Secure PWA 52679 lifting adapter to nozzle assembly as follows:

(1) Using hoist and PWA 52644 sling, position PWA 52679 adapter over nozzle assembly.

(2) Open adapter so that it clears OD of nozzle support.

(3) Lower adapter onto front flange of nozzle support (Flange L). Ensure that front flange of nozzle support sits on step of adapter. Secure adapter using swing bolt detail.

(4) Ensure nozzle is in fully closed position.

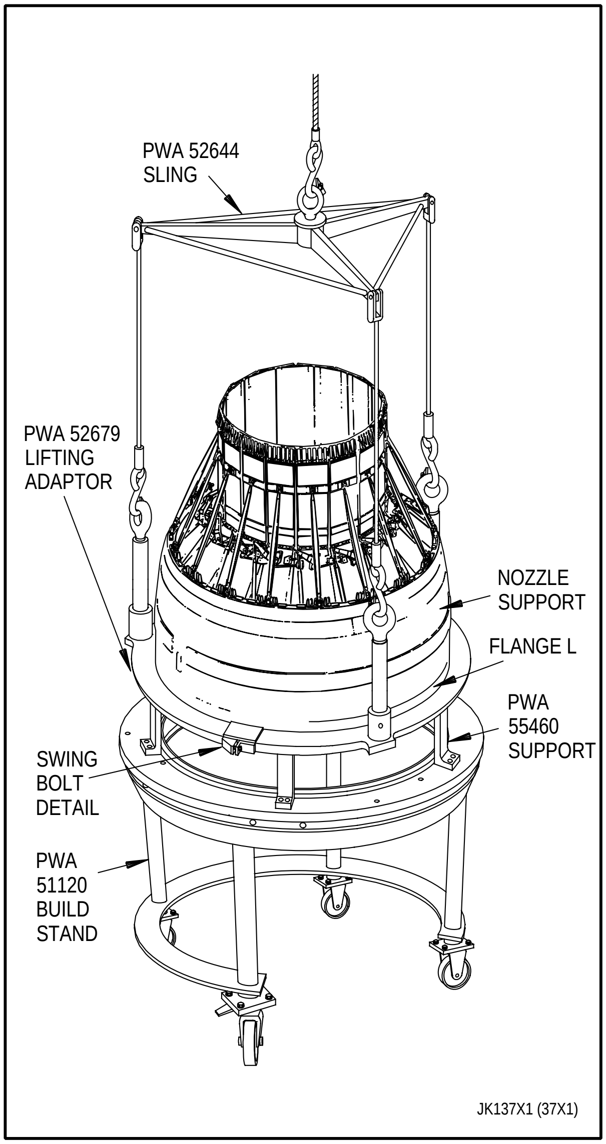


Figure 2. Augmentor Nozzle Assembly - Installation (Sheet 2 of 9)

c. Apply PMC 9609 petrolatum to lower edge of back side on PWA 52681 guides.

d. Hang PWA 52681 guides on duct brace so that petrolatum coated edges of guide cover duct seals.

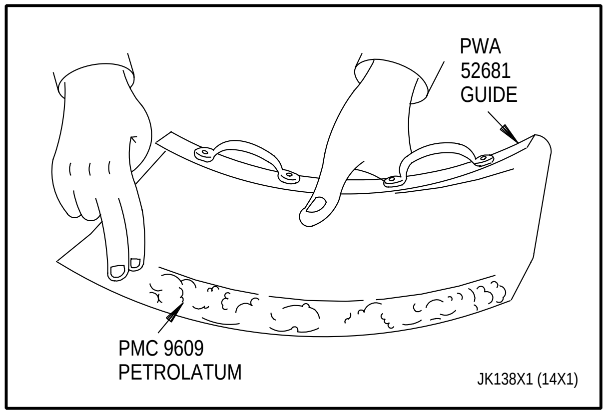


Figure 2. Augmentor Nozzle Assembly - Installation (Sheet 3 of 9)

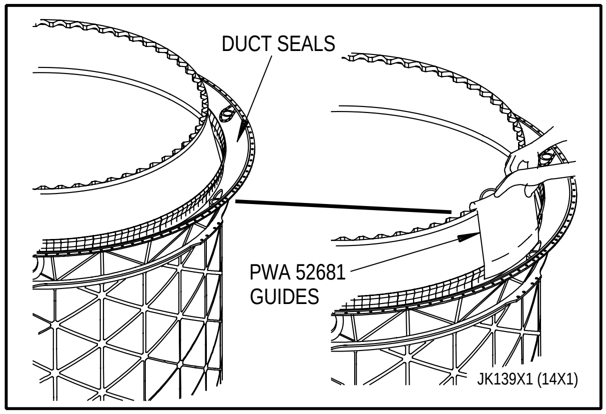


Figure 2. Augmentor Nozzle Assembly - Installation (Sheet 4 of 9)

e. Tilt duct and station mechanic inside to aid assembly.

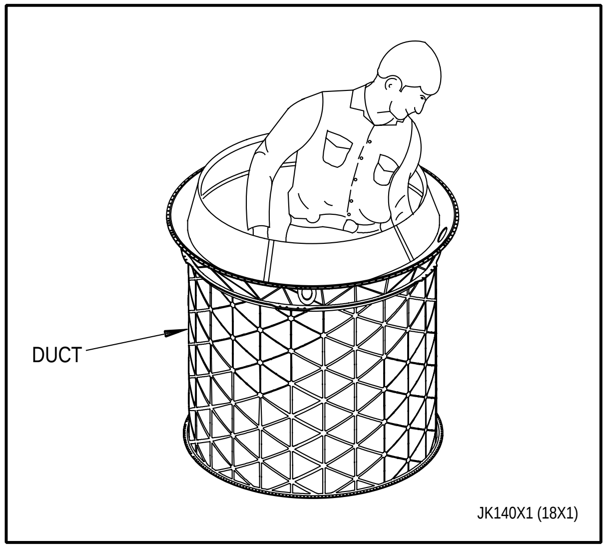


Figure 2. Augmentor Nozzle Assembly - Installation (Sheet 5 of 9)

CAUTION

- Ensure that balance nozzle segment interconnecting hardware is properly installed. Omission of hardware will result in balance nozzle sealing loss which may cause a nozzle fire during augmented engine operation.
- Threads of bolt shall protrude through nut.

f. Check balance nozzle segment interconnecting hardware for proper installation. If not installed properly, reassemble hardware per T.O. 2J-F100-53-10, WP 603 00.

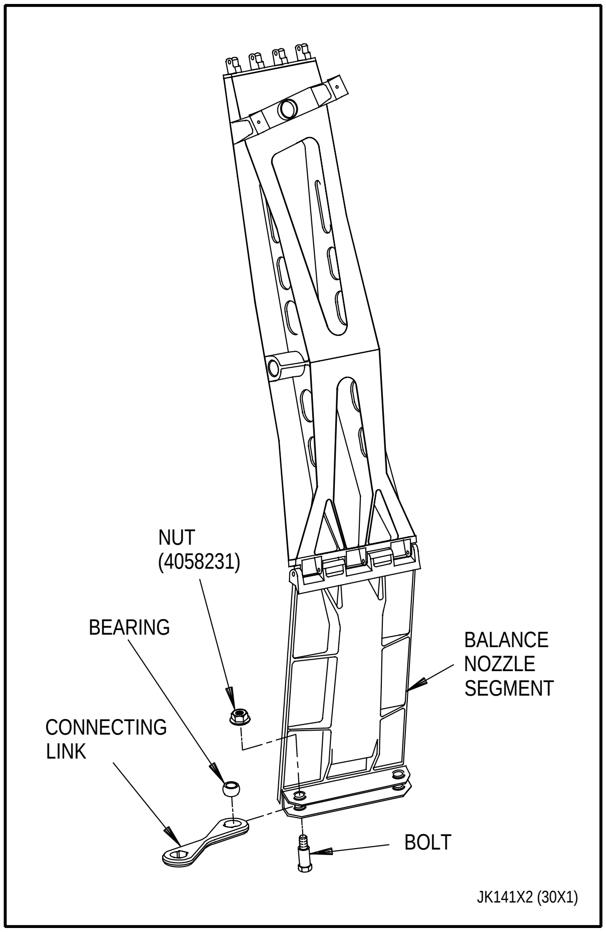


Figure 2. Augmentor Nozzle Assembly - Installation (Sheet 6 of 9)

WARNING

Proceed slowly with assembly of nozzle support and duct to prevent injury to mechanic. Keep fingers clear of seal area.

NOTE

- Finger valve assembly on duct is located at 6 o'clock position
- Offset hole in nozzle support is 4th hole clockwise from 12 o'clock position.

g. Raise nozzle support from build stand and position over duct. Maintain alignment between boss and finger valve assembly. Insert alignment pin in offset hole of nozzle support. Keep offset holes of support and duct aligned.

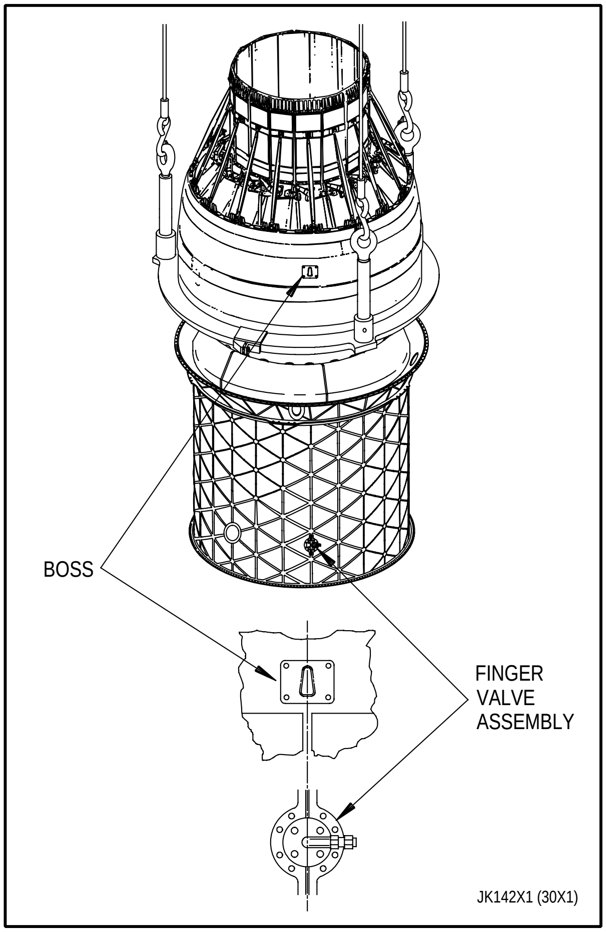


Figure 2. Augmentor Nozzle Assembly - Installation (Sheet 7 of 9)

NOTE

Leading edges of balance nozzle segment and balance nozzle segment seal shall clear PWA 52681 guide and fit into cavity of duct.

h. Lower nozzle support onto duct. Remove guides one at a time.

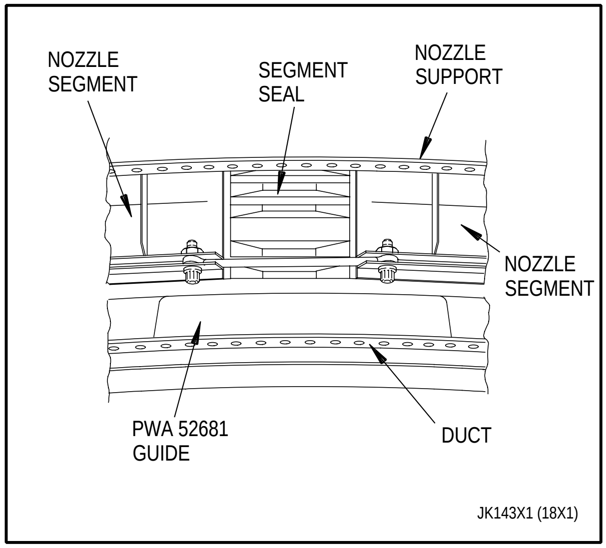


Figure 2. Augmentor Nozzle Assembly - Installation (Sheet 8 of 9)

i. Install eight equally spaced 0.190-32UNJF workbolts. Tighten two bolts 180 degrees apart. Then tighten two bolts 90 degrees from first two bolts. Tighten remaining bolts.

CAUTION

Flexible shafts (if installed) shall not be used as handholds. Shaft housing may become bent, resulting in shaft failure during engine operation.

j. Raise augmentor duct and nozzle assembly, allowing mechanic to exit.

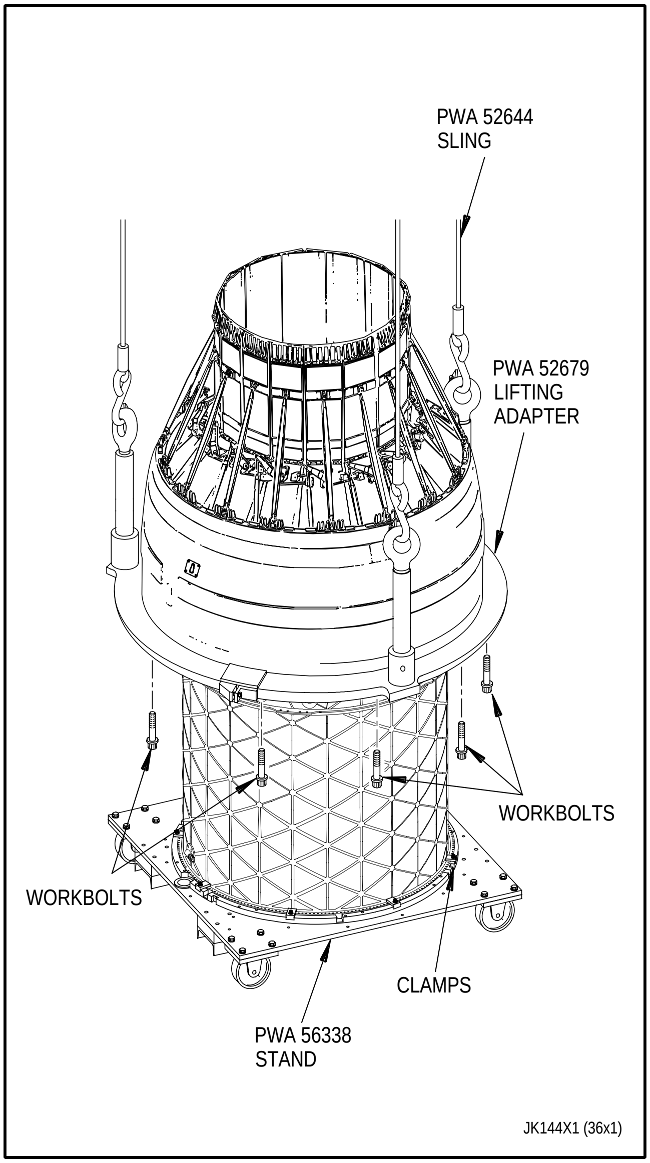


Figure 2. Augmentor Nozzle Assembly - Installation (Sheet 9 of 9)

4. AUGMENTOR COMBUSTION CHAMBER LINER - INSTALLATION.

(See Figure 3.)

a. Place liner(7, figure 3), front flange down, on several 4 x 4 inch wood blocks(8) positioned on floor.

b. Locally manufacture a strip of Velcro(5), 2 inches wide by 130 inches long. Install around outside of liner seals(4) to hold position. Ensure Velcro strip(5) is properly positioned on liner seals(4). See figure 3.

c. Clean bottom 30° arc (10 bolt holes on either side of BDC) of duct(8) and liner(7) mating flanges by wiping with clean unsized cheesecloth moistend with isopropyl alcohol or acetone. Air dry.

NOTE

Liner has two offset holes 25 degrees apart. Offset holes may not be used during installation of liner.

d. Mark offset hole on front flange of liner.

e. Mark offset hole on front flange of augmentor duct.

f. Ensure nozzle is in fully closed position.

CAUTION

Do not allow augmentor duct to support weight of nozzle assembly and PWA 52679 lifting adapter. Always support weight with PWA 52644 sling.

g. Using PWA 52644 sling(1) and PWA 52679 lifting adapter(2), lift augmentor duct and nozzle assembly off transportation stand, and position over liner. Align offset holes of augmentor duct(8) and liner(7).

WARNING

Installation of augmentor duct onto liner should be executed slowly, with caution, to prevent injury to person stationed inside liner. Keep fingers clear of liner seals and augmentor duct.

h. Slowly lower augmentor duct and nozzle assembly(8) onto liner(7), but do not seat all the way. Ensure liner seals(4) do not contact convergent nozzle segment liners(3).

i. Apply a continuous 0.060 to 0.090 inch bead of PWA 36057 (RTV 116 only) to previously cleaned bottom 30° arc (10 bolt holes on either side of BDC) of liner(7) mating flange. See View B.

j. Lower duct and nozzle assembly(8) until properly seated on liner(7).

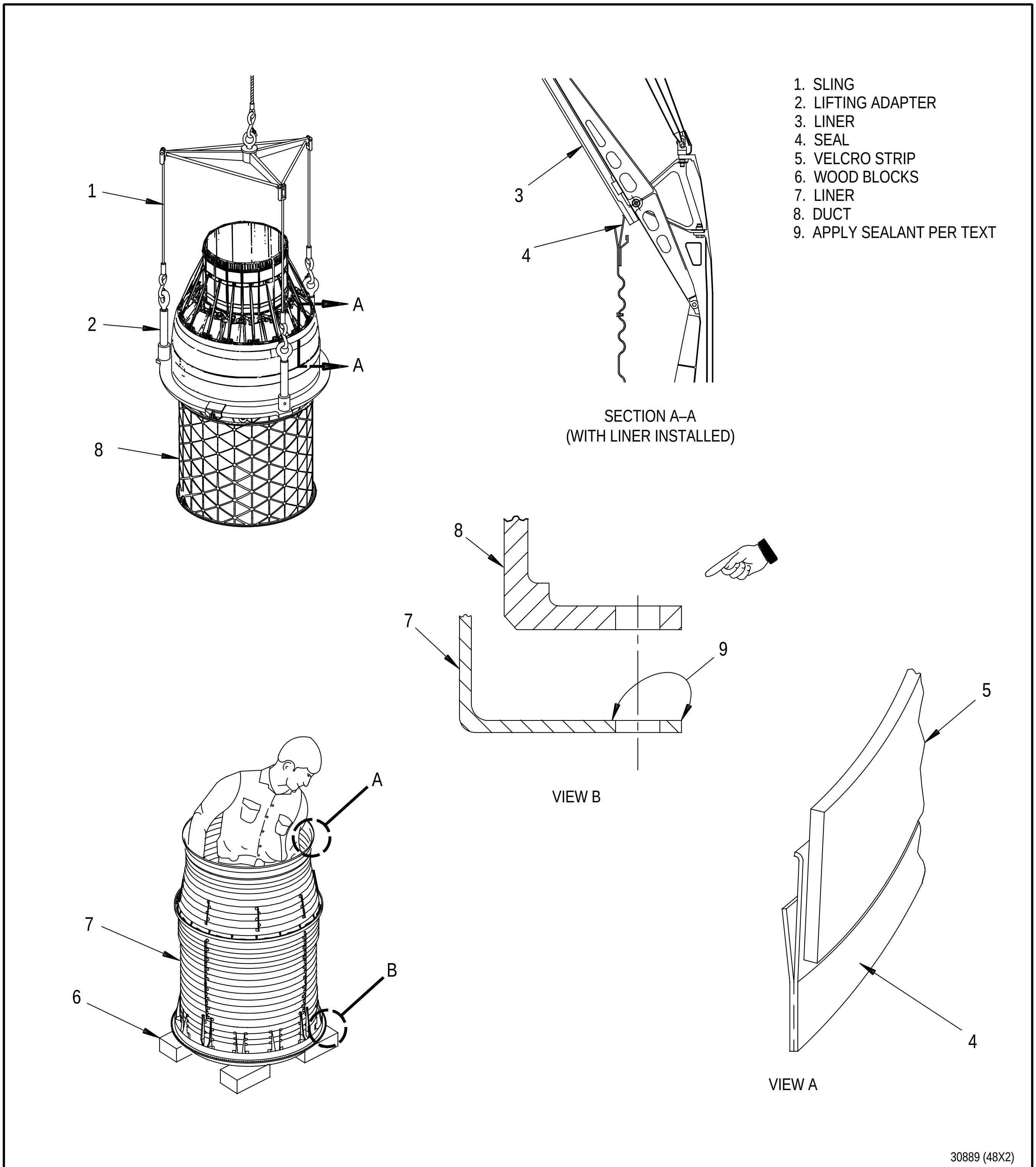


Figure 3. Augmentor Combustion Chamber Liner - Installation

k. Remove Velcro strip. Ensure liner seals(4) are properly positioned on convergent nozzle segment liners(3) as shown in Section A-A.

l. Secure augmentor duct flange to liner flange with four workbolts fingertight at 3, 6, 9, and 12 o’clock positions.

CAUTION

Flexible shafts shall not be used as handholds. Shaft housing may become bent, resulting in shaft failure during engine operation.

NOTE

Shoulder side of PWA 56338 detail-33 locating ring faces up for installation of augmentor duct and nozzle assembly onto stand.

m. Install augmentor duct and nozzle assembly onto PWA 56338 stand. Secure duct with clamps and remove PWA 52644 sling and PWA 52679 lifting adapter.

5. CONVERGENT NOZZLE PRIMARY AND SECONDARY BALL SCREW ACTUATORS - SIZING.
(See Figure 4.)

NOTE

PWA 51758 checking fixture shall be indexed so that Dimension R equals 9.560 to 9.570 inches.

a. Index PWA 51758 checking fixture to Dimension R as follows:

(1) Install detail-14 set master on PWA 51758 fixture. Install end of set master with pin into one end of detail-10 block. Install loose pin through other end of block, and slide detail-12 clamp until pins support set master.

(2) Secure detail-14 set master by tightening detail-11 hand knob.

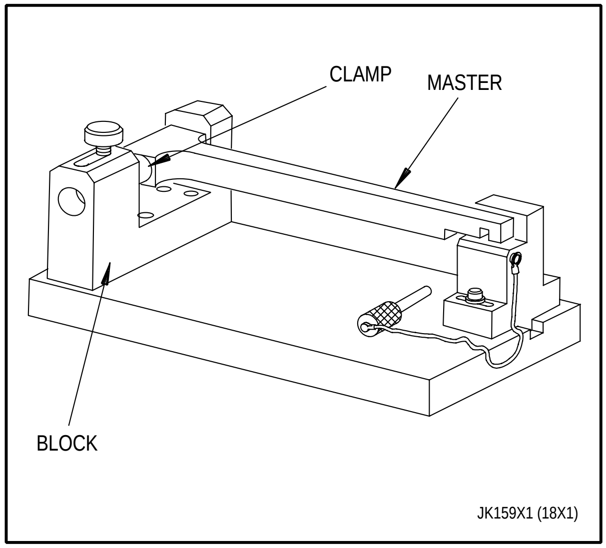


Figure 4. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Sizing (Sheet 1 of 9)

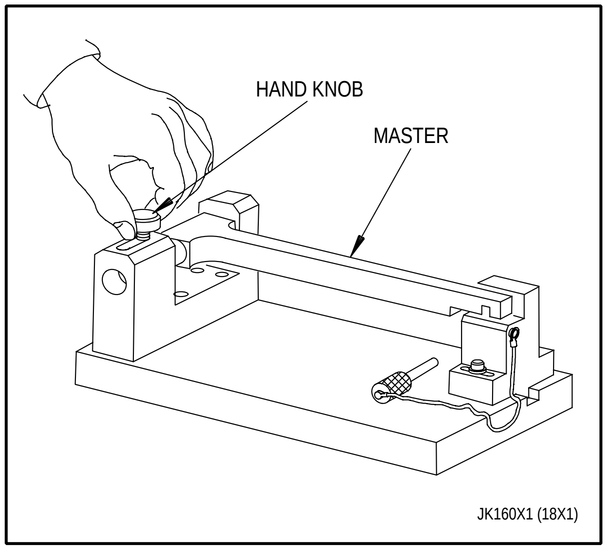


Figure 4. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Sizing (Sheet 2 of 9)

(3) Loosen detail-4 cap screws. Move detail-5 adjustable block until detail-17 alignment pin slides freely through slot in detail-14 set master and hole in adjustable block.

(4) Tighten detail-4 cap screws to prevent movement of detail-5 adjustable block.

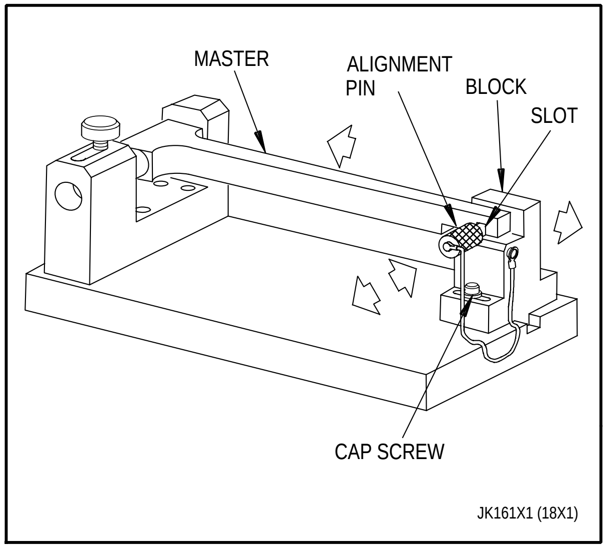


Figure 4. Convergent Nozzle Primary and Secondary Screw Actuators - Sizing (Sheet 3 of 9)

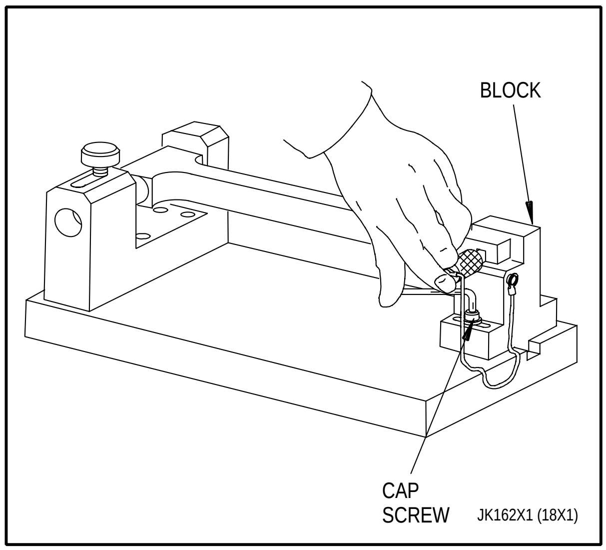


Figure 4. Convergent Nozzle Primary and Secondary Screw Actuators - Sizing (Sheet 4 of 9)

NOTE

Do not disturb fixture setting Dimension R (9.560 to 9.570 inches).

(5) Remove detail-14 set master and detail-17 alignment pin from PWA 51758 fixture.

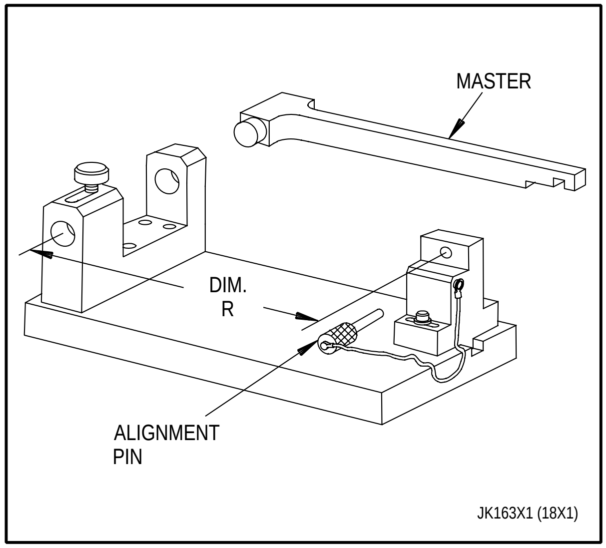


Figure 4. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Sizing (Sheet 5 of 9)

b. Verify that preset length of actuators equals 9.560 to 9.570 inches (Dimension R) as follows:

(1) Install actuator in PWA 51758 fixture. Align actuator support bearings with hole in one end of detail-10 block and detail-12 clamp in other end of block. Slide clamp until actuator is supported at bearings. Secure actuator by tightening detail-11 hand knob.

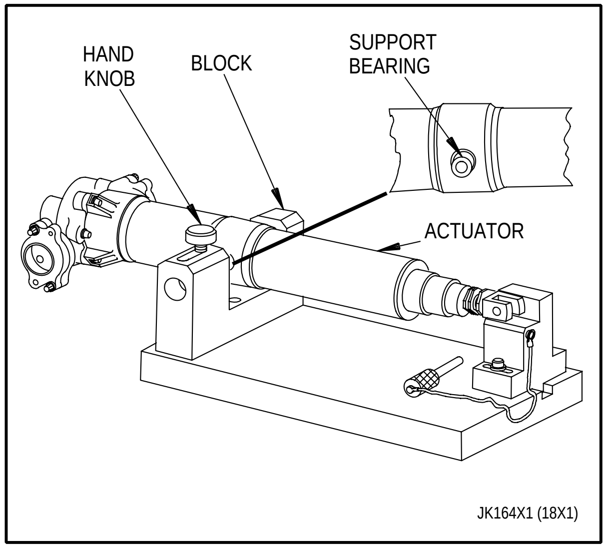


Figure 4. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Sizing (Sheet 6 of 9)

CAUTION

Do not apply excessive torque after actuator has reached full stop. Actuator can be damaged.

(2) Retract actuator to hard stop.

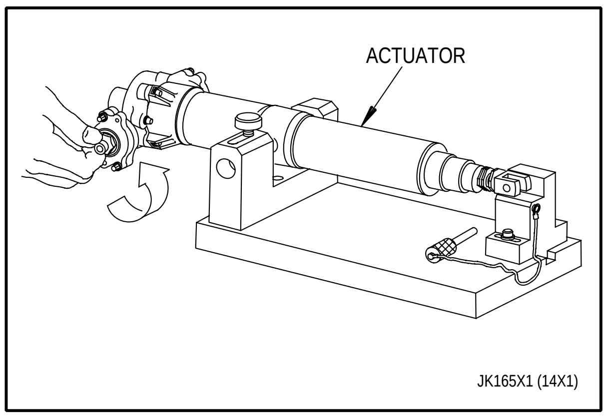


Figure 4. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Sizing (Sheet 7 of 9)

(3) Install detail-17 alignment pin through holes in clevis and detail-5 adjustable block. If pin fits easily, preset length of actuator is correct.

(4) If alignment pin does not fit easily, remove lockwire and loosen jamnut. Adjust clevis until alignment pin fits easily through clevis and adjustable block. Tighten jamnut fingertight.

(5) Remove actuator from fixture.

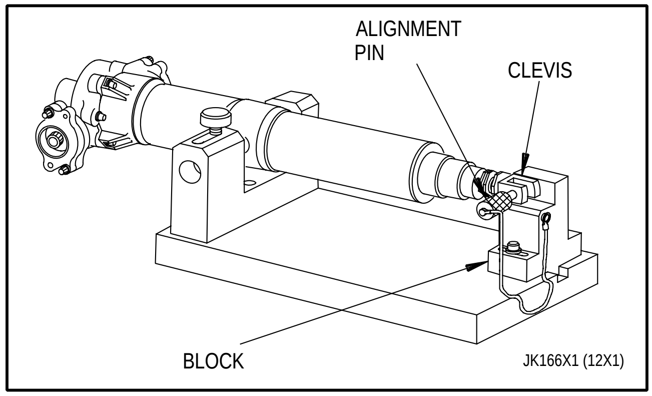


Figure 4. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Sizing (Sheet 8 of 9)

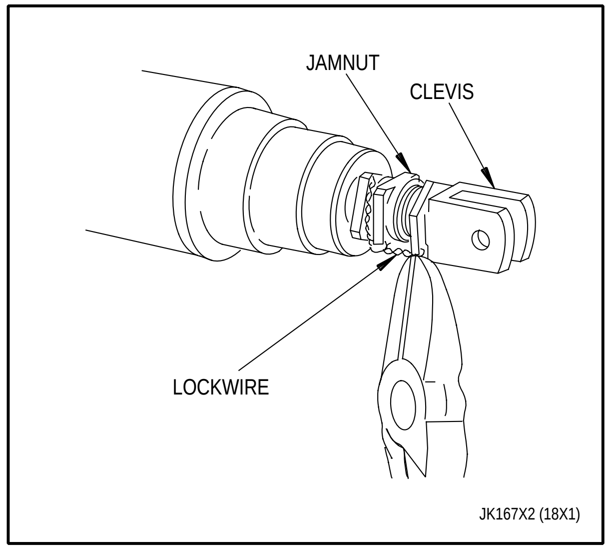


Figure 4. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Sizing (Sheet 9 of 9)

6. CONVERGENT NOZZLE PRIMARY AND SECONDARY BALL SCREW ACTUATORS - INSTALLATION.
(See Figures 5 and 6.)

a. Install left (PN 4071201) supports on duct flange at locations indicated in figure 5.

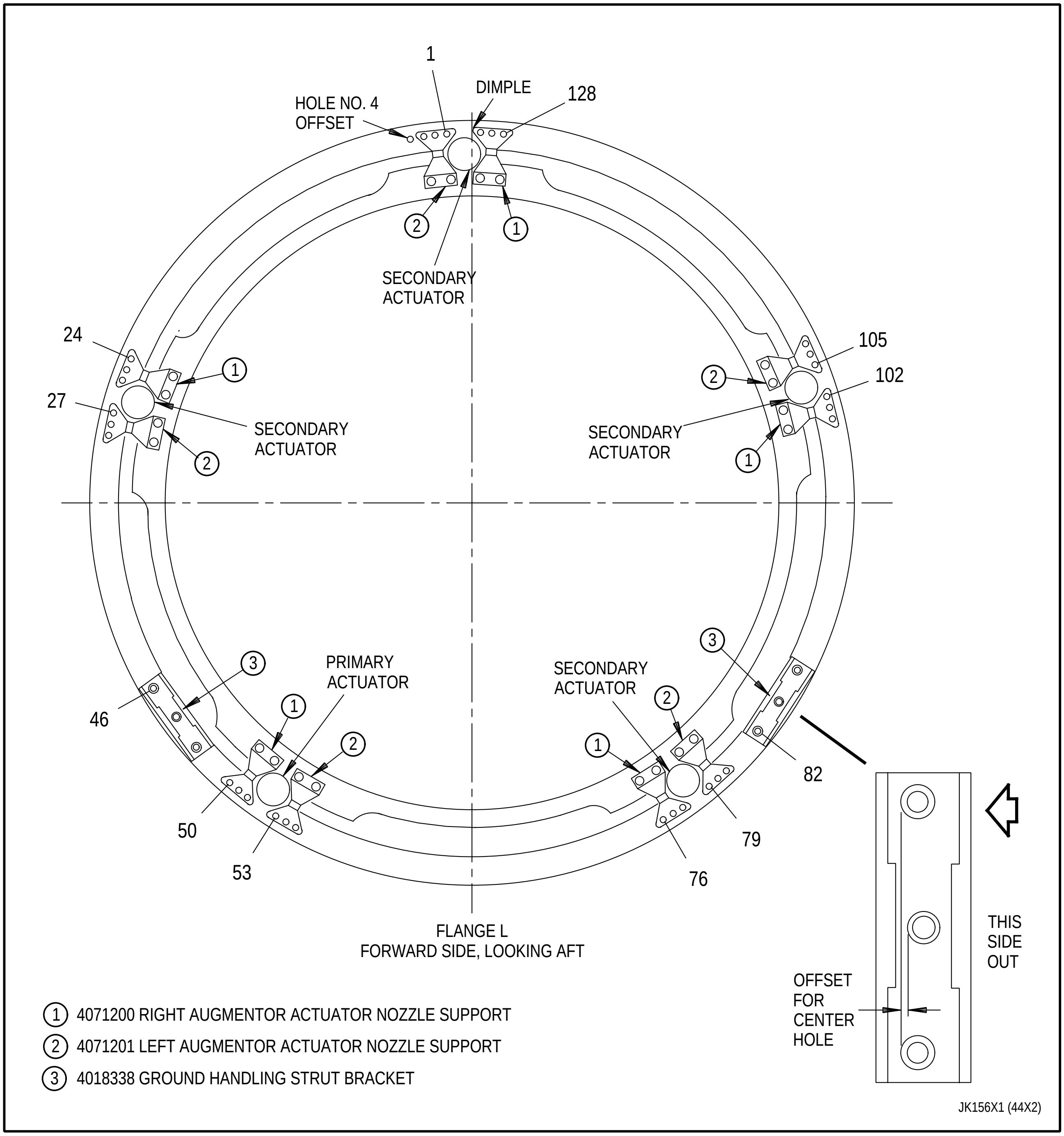


Figure 5. Flange L Support Locations

b. Ensure actuators have been preset. If not, preset actuators per paragraph 5.

CAUTION

Actuators can be damaged if excessive torque is applied after travel reaches full stop.

c. Retract all actuators to hard stop. Install spring and spring seat on actuators.

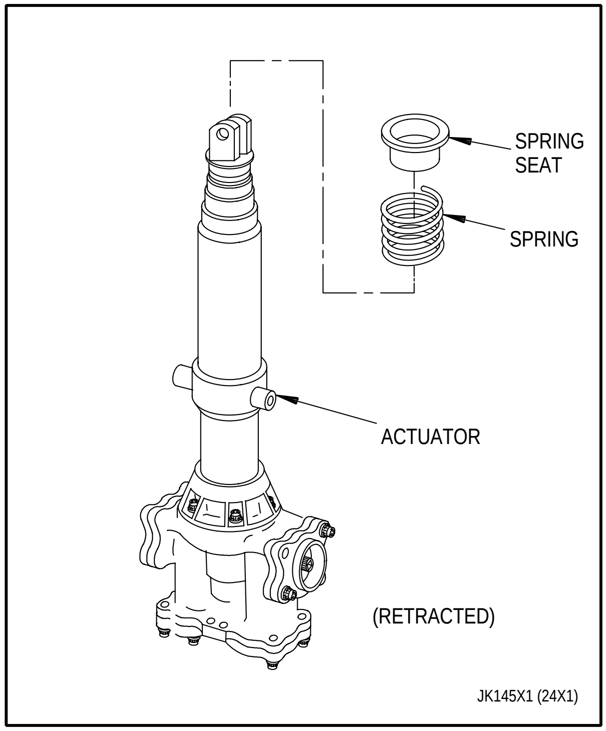


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 1 of 11)

(1) Apply PWA 36545 antigalling compound to threads of bolts. Secure supports with nuts and bolts. Torque bolts 27 to 30 pound-inches.

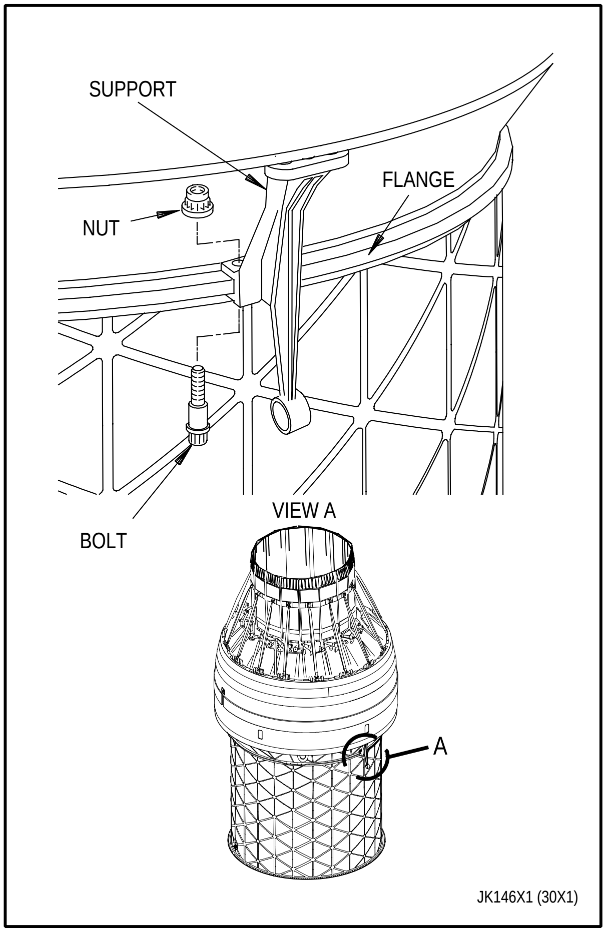


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 2 of 11)

c1. Move nozzle segments to closed position to prevent interference between actuators and synchronizing ring.

NOTE

- Primary actuator shall be installed at approximately 5 o'clock position.
- Finger valve assembly is located at 6 o'clock position.

d. Install primary actuator at location shown. Insert clevis end of actuator into mounting hole in duct. Align clevis with synchronizing ring connecting link and engage actuator into left support bearing.

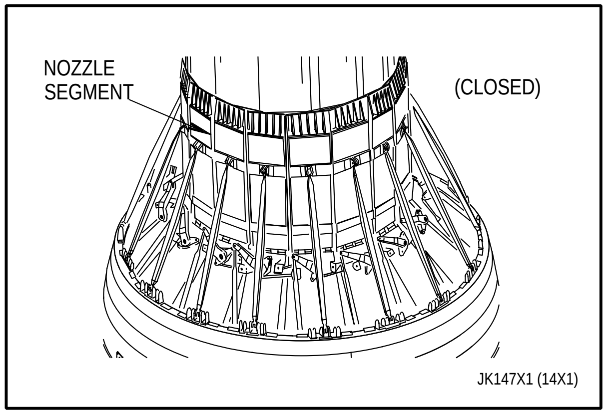


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 3 of 11)

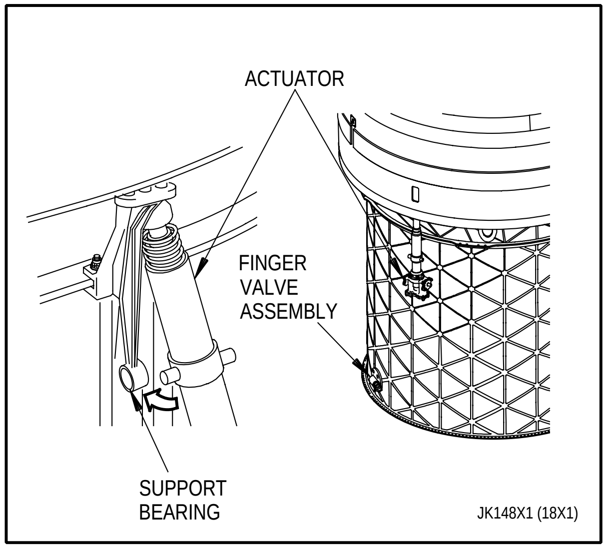


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 4 of 11)

e. Install right (PN 4071200) support on actuator. Apply PWA 36545 antigalling compound to threads of bolt. Secure support to flange with bolts and nuts. Torque bolts 27 to 30 pound-inches.

f. Lubricate bolts with PWA 550 antigalling compound. Install bolts and PN 4052098 key washers. Torque bolts 23 to 26 pound-inches. Lockwire bolts with PN MS9226-04 wire.

g. Repeat steps d. through f. to install remaining actuators.

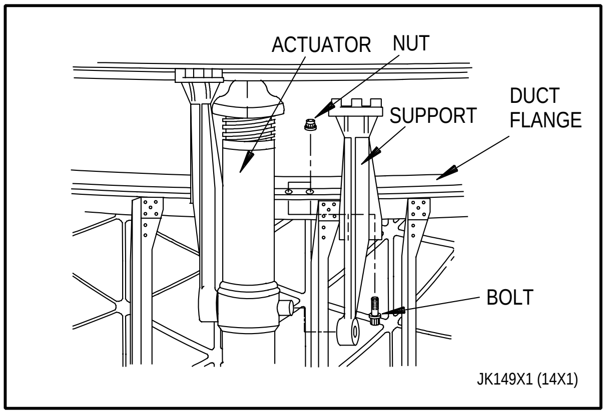


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 5 of 11)

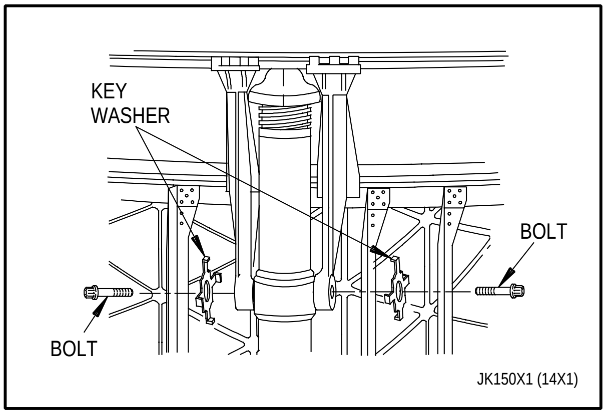


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 6 of 11)

NOTE

All engine bolts installed through Flange L at final assembly require antigalling compound.

h. Coat threads of bolts for Flange L with PWA 550 antigalling compound.

i. Remove workbolts in Flange L, as required, during installation of engine bolts in step j.

j. Install bolts through Flange L as follows:

(1) Install two ground handling brackets at locations shown in figure 5. Secure with bolts. Torque bolts 27 to 30 pound-inches.

(2) Secure left and right supports with bolts. Torque bolts 43 to 48 pound-inches.

(3) Install remaining bolts and torque 27 to 30 pound-inches.

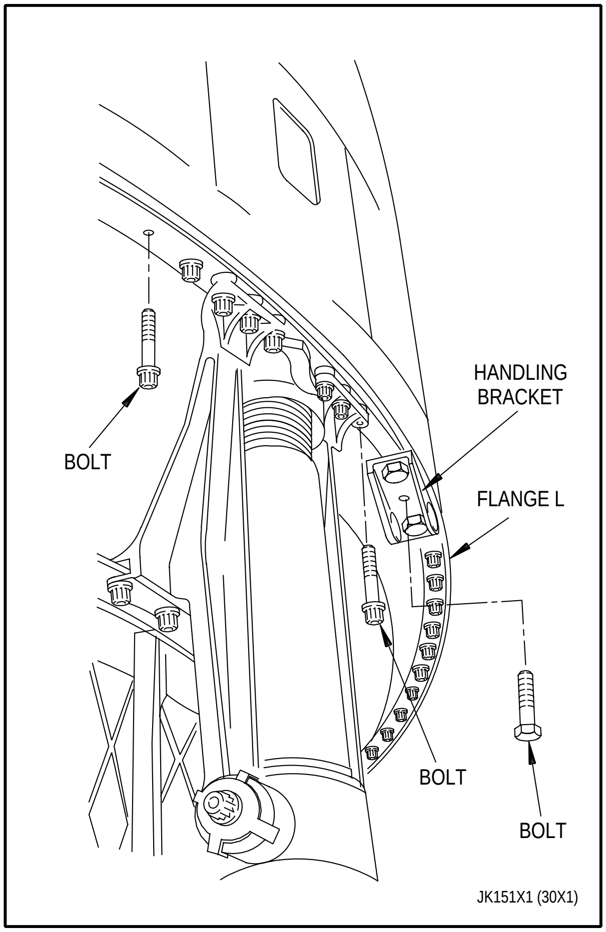


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 7 of 11)

CAUTION

Exercise care while installing flexible shafts. Shaft housing can be easily bent, resulting in shaft failure.

k. Fully retract actuators and install flexible shafts starting at primary actuator. Work around nozzle until returning to opposite side of primary actuator as follows:

CAUTION

Actuators can be damaged if excessive torque is applied after travel reaches full stop.

(1) Ensure positive retraction of actuator by turning drive in clockwise direction against stop.

(2) Slide back dust cover on square end drive of shaft. Insert shaft into square drive of actuator.

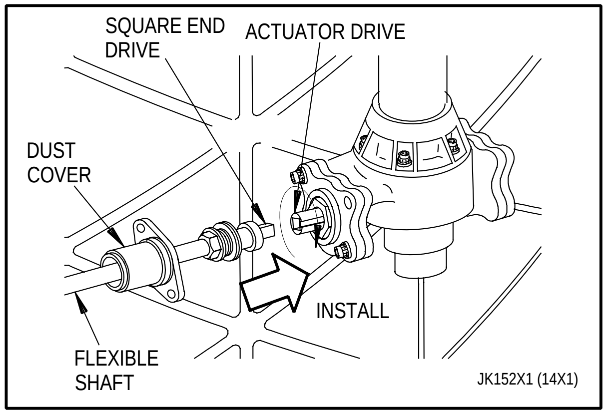


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 8 of 11)

(3) Align splined coupling and splined end drive of actuator without turning splined end drive of actuator. Install shaft and slide sleeve over splined end drive of actuator.

CAUTION

Omission or improper bending of cotter pins (five locations) can cause considerable damage to augmentor mechanism during engine operation.

(4) Flatten head of PN MS9245-28 cotter pin to form a T. Install T-shaped cotter pin into splined sleeve, and secure by bending ends of cotter pin around sleeve.

(5) Repeat steps k. through m. for all flexible shafts.

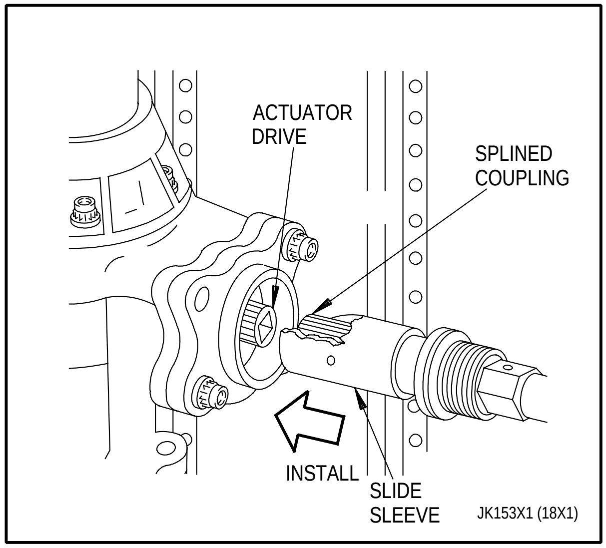


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 9 of 11)

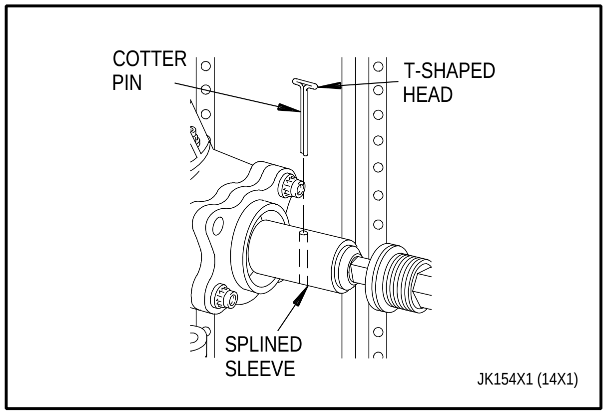


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 10 of 11)

l. Lubricate bolts with MIL-L-7808 engine oil. Secure dust covers using bolts. Torque bolts 12 to 16 pound-inches and lockwire with PN MS9226-02 wire.

m. Hold cable nut from turning and torque jamnuts 35 to 40 pound-inches. Lockwire with PN MS9226-02 wire.

n. Perform augmentor convergent nozzle area sizing per WP 702 00, to verify rigging if the following components have been removed or replaced:

- convergent nozzle segment
- augmentor nozzle lever
- damaged actuators
- damaged primary or secondary actuator flexible shafts
- any linkage items involving the synchronizing ring

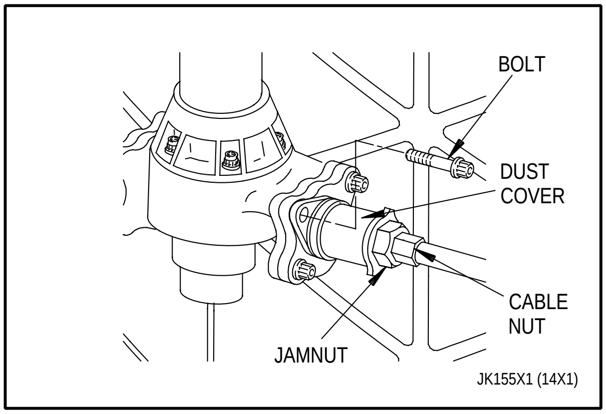


Figure 6. Convergent Nozzle Primary and Secondary Ball Screw Actuators - Installation (Sheet 11 of 11)

7. AUGMENTOR EXTERNAL NOZZLE SEGMENTS - INSTALLATION.
(See Figure 7.)

WARNING

Exercise extreme care not to pinch fingers between segments when closing divergent nozzle.

a. If convergent nozzle segments are in open position, close using PWA 51757 torque adapter or PWA 56639 adapter. Divergent nozzle segments may be closed by using hand pressure.

CAUTION

Rod end bearing assembly has two configurations. One configuration(10, figure 7) has a bearing loading slot and the other one(7) does not. Be careful to prevent bearing from falling out of loading slot because bearing could be damaged.

NOTE

Extreme care must be taken to prevent dropping hardware into nozzle support.

b. For rod end bearing assemblies without loading slot(7), install in connecting link bracket(9) as follows:

(1) Apply PWA 36545 (Everlube 382) antigalling compound to nuts(8).

(2) Position rod end bearings in connecting link bracket(9).

(3) Secure bearings with bolts(6) and nuts(8).

(4) Torque nuts 62 to 72 pound-inches.

c. For rod end bearing assemblies with loading slot(10), install in connecting link bracket(9) as follows:

(1) Apply PWA 36545 (Everlube 382) antigalling compound to nuts(8).

(2) Position rod end bearings(10) in connecting link bracket(9).

(3) Insert bolts(6) through connecting link bracket(9) and rod end bearings(10).

(4) Install nuts(8) on bolts(6) and turn until nuts contact connecting link bracket(9). Observe and record run-on torque required before contact. Run-on torque must be 5 pound-inches minimum.

(5) Torque nuts 10 to 20 pound-inches above maximum recorded run-on torque. Do not exceed 80 pound-inches total torque.

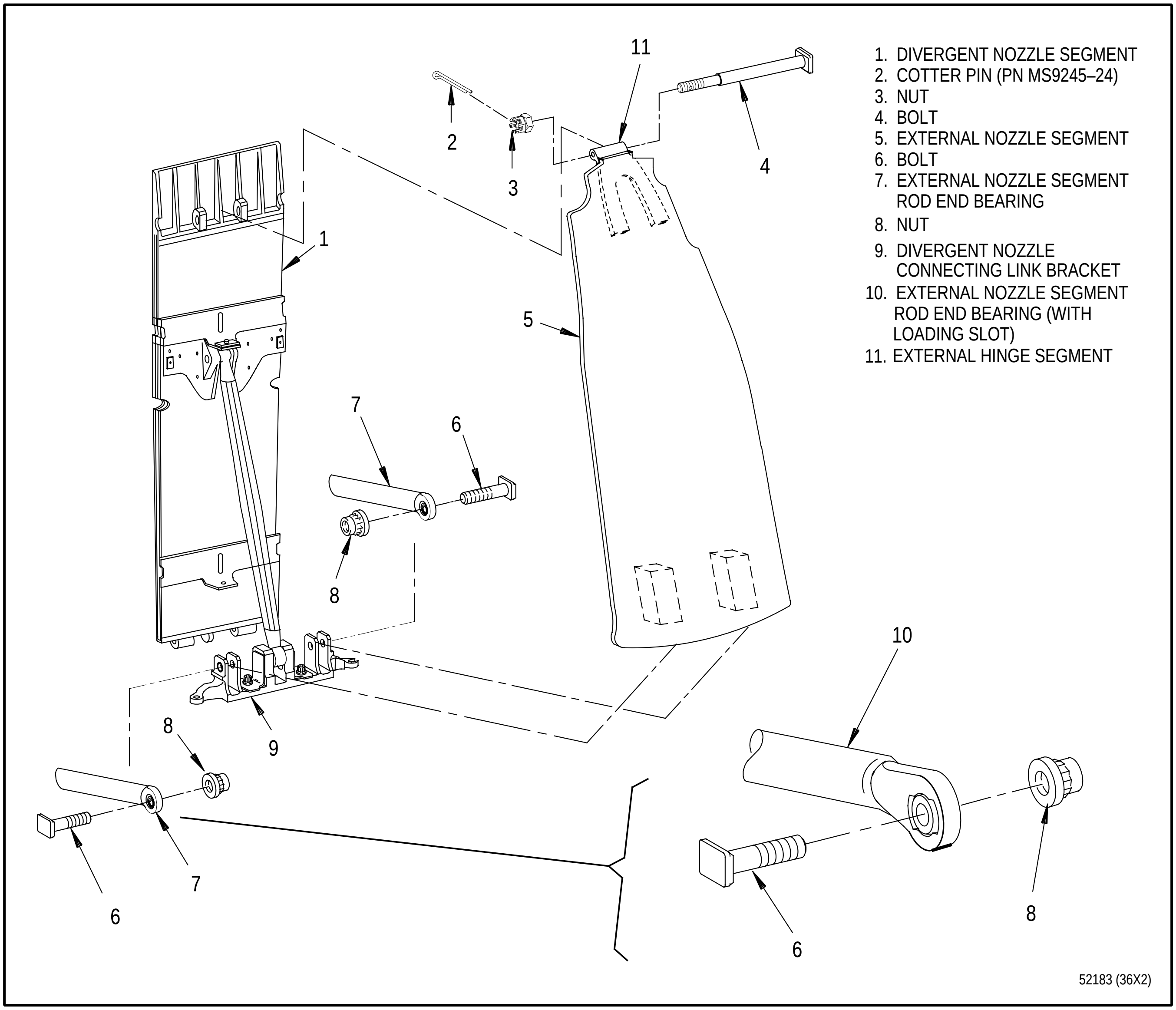


Figure 7. Augmentor External Nozzle Segments - Installation

d. Insert external nozzle segment(5) onto rod end bearings(7). Ensure forward right corner of external nozzle segment does not hang-up on nozzle support seals.

e. Work in clockwise direction installing right side of external nozzle segments over left side of installed external nozzle segments.

f. Deleted.

g. Position aft hinges of external nozzle segments into hinge lugs on divergent nozzle segments.

h. Install cloth into openings around aft hinge to keep parts from falling into augmentor.

i. Secure aft hinge of external nozzle segment to divergent nozzle segment(1) as follows:

   (1) Apply PWA 550 antigalling compound to shank of bolts(4) and install bolts.

   (2) Apply PWA 36545 antigalling compound to threads of nuts(3).

   (3) Secure external nozzle segment to divergent nozzle segment with bolts(4) and nuts(3).

   (4) Torque nuts(3) to a minimum of 20 pound-inches. Then tighten nuts as needed until a slot in nut aligns with hole in bolt. Do not exceed 37 pound-inches when torquing nuts.

   (5) Install new cotter pin(2) through nut and bolt, and bend tab to secure nut.

8. FOLLOW-ON MAINTENANCE.

a. Perform the augmentor convergent and divergent nozzle functional check per WP 703 00 on all augmentor modules which have been reassembled following repair or replacement of parts. Also, perform this check if the proper functioning of either the convergent or divergent nozzle is in question.

b. Install augmentor duct and nozzle module on engine. Refer to T.O. 2J-F100-53-5, WP 227 00.

WORK PACKAGE

TECHNICAL PROCEDURES

AUGMENTOR CONVERGENT NOZZLE AREA SIZING

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, ANTIGALLING (PWA 36035)	FEL-PRO C-300

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
KEY WASHER	4025416	5
LOCKWIRE (0.020 INCH DIAMETER)	MS9226-02	AS REQUIRED

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
3	AUGMENTOR CONVERGENT NOZZLE AREA SIZING PROCEDURE	
	PIN, RIGGING SET -	PWA 57701
	TORQUE ADAPTER, PRIMARY CONVERGENT NOZZLE BALLSCREW ACTUATOR, TURN AND COUNT - - - - - - - - - - - - - - - - - -	PWA 51757 OR
	ADAPTER, AUGMENTOR NOZZLE ACTUATOR DRIVE - - - - - - -	PWA 56639

ILLUSTRATED SUPPORT EQUIPMENT

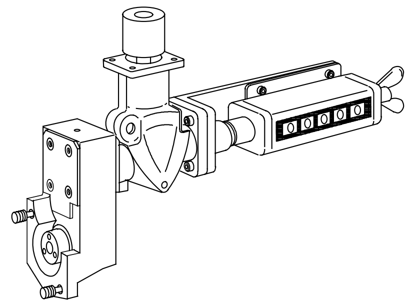

PWA 51757 –C

Figure T1. PWA 51757 TORQUE ADAPTER

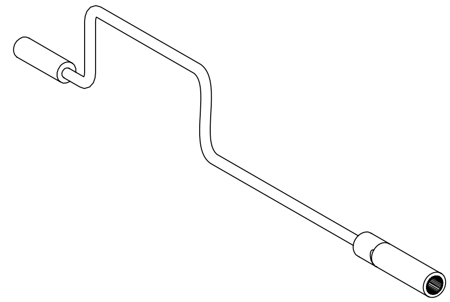
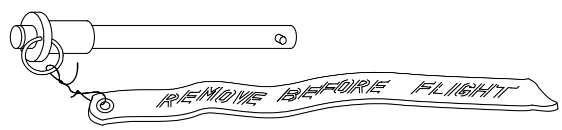

PWA 56639 –C

Figure T2. PWA 56639 ADAPTER



PWA 57701 –C

Figure T3. PWA 57701 PIN

1. INTRODUCTION.

a. This work package contains procedures for augmentor convergent nozzle area sizing.

2. PRELIMINARY INSTRUCTIONS.

a. Remove augmentor nozzle segment seal assemblies, if installed.

3. AUGMENTOR CONVERGENT NOZZLE AREA SIZING PROCEDURE.
(See Figures 1 through 6.)

a. Close nozzle by manually turning bellcranks.

b. Install PWA 57701 rigging pin set through static structure slots and synchronizing ring.

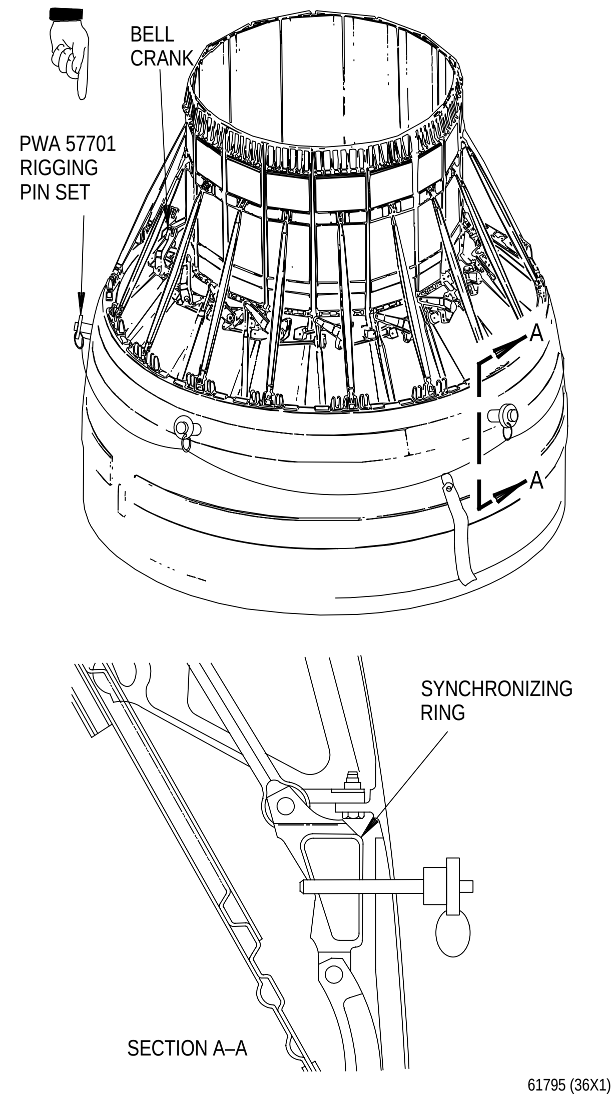


Figure 1. Augmentor Convergent Nozzle Area Sizing - Rigging Pin Installation

c. Install PWA 51757 torque adapter or PWA 56639 adapter into primary actuator left hand drive.

CAUTION

To avoid damage to flexible drive shaft, do not adjust actuator more than 2 1/2 turns in either direction.

NOTE

If actuator rod end bottoms against lug before actuator reaches fully closed stop, adjust actuator as required.

d. Turn wrench clockwise to extend actuator to hard stop position.

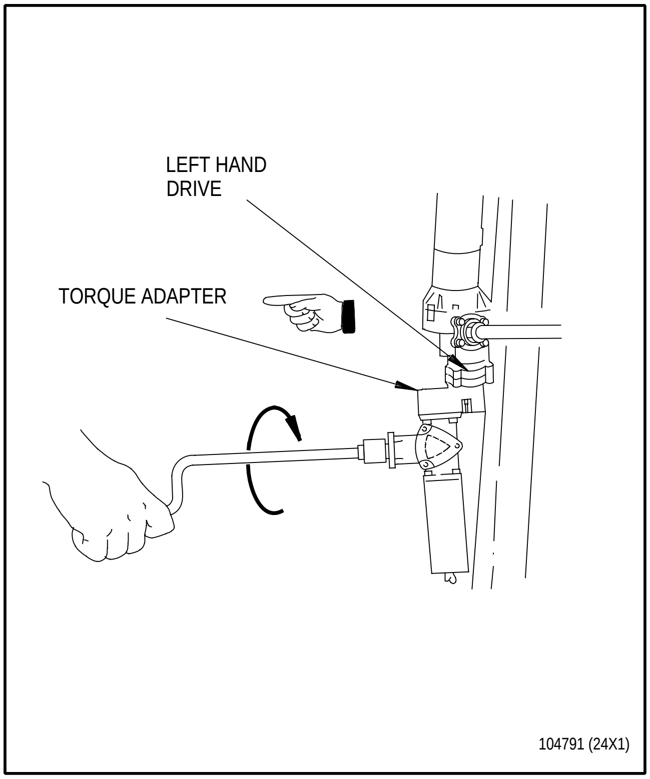


Figure 2. Augmentor Convergent Nozzle Area Sizing - Retracting Actuators to Stops

e. Adjust each actuator as follows:

(1) If necessary, cut and remove lockwire, loosen jamnut, and adjust rod end as required to align actuator clevis end hole and connecting link hole.

(2) Check alignment at each location using PN 4036610 pin.

(3) Torque jamnut 425 to 475 pound-inches. Lockwire with PN MS9226-02 lockwire.

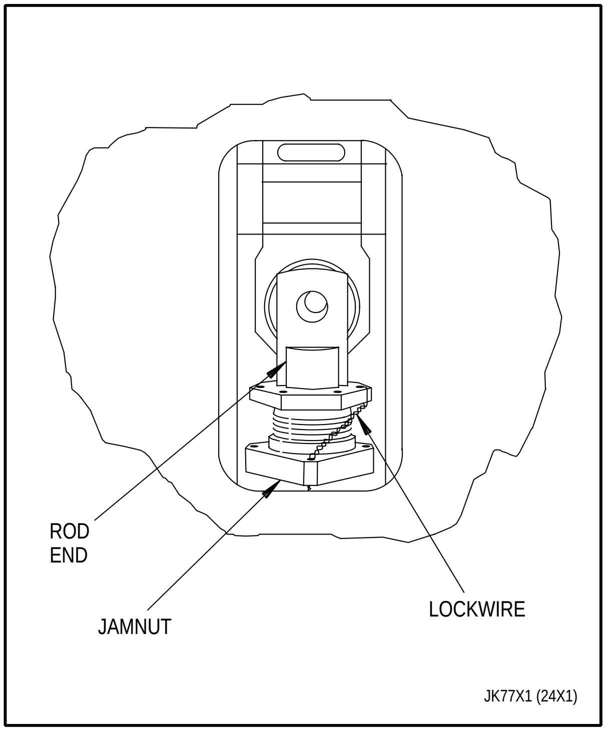


Figure 3. Augmentor Convergent Nozzle Area Sizing - Aligning Actuator Clevis and Connnecting Link

f. Install clevis to connecting link as follows:

CAUTION

To prevent damage to augmentor mechanism, ensure clevis pin is installed correctly.

NOTE

Work one actuator at a time.

(1) Position new key washer between clevis and lug.

(2) Align through hole of key washer and clevis.

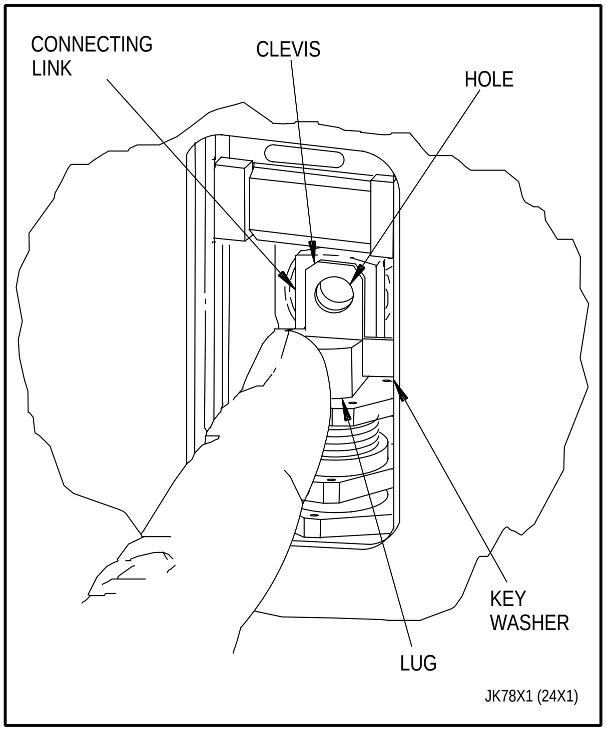


Figure 4. Augmentor Convergent Nozzle Area Sizing - Key Washer Installation

(3) Apply Fel-Pro C-300 Anti-Galling compound to pin. Install pin through key washer, clevis, and connecting link.

(4) Rotate pin so that longer end of pin head is positioned behind clevis lug.

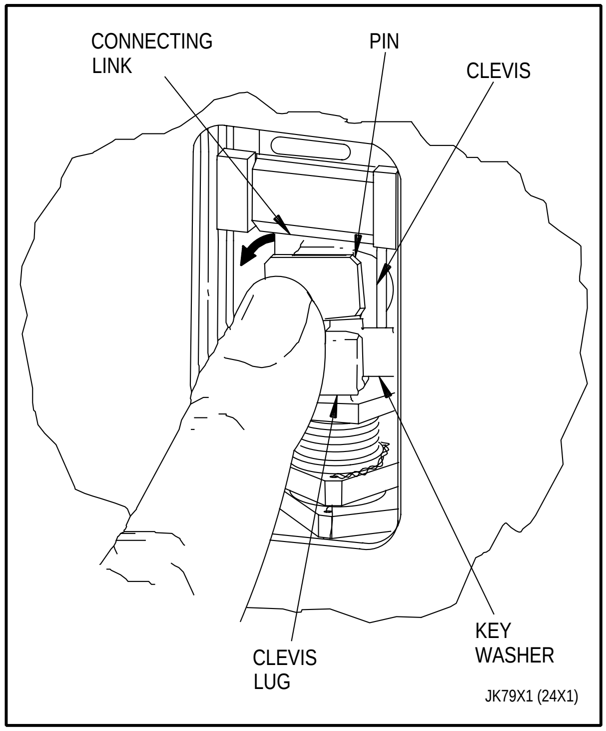


Figure 5. Augmentor Convergent Nozzle Area Sizing - Pin Installation

NOTE

- Ensure long end of clevis pin head is behind clevis lug before bending tabs of key washer.
- Maximum gap between key washer tab and clevis lug shall not exceed 0.020 inch.

(5) Ensure freedom of movement between mating parts and bend tabs of key washer around clevis lug.

(6) Repeat procedure at remaining locations.

(7) Remove rigging pin set.

4. FOLLOW-ON MAINTENANCE.

a. Install nozzle segment seal assemblies, if previously removed.

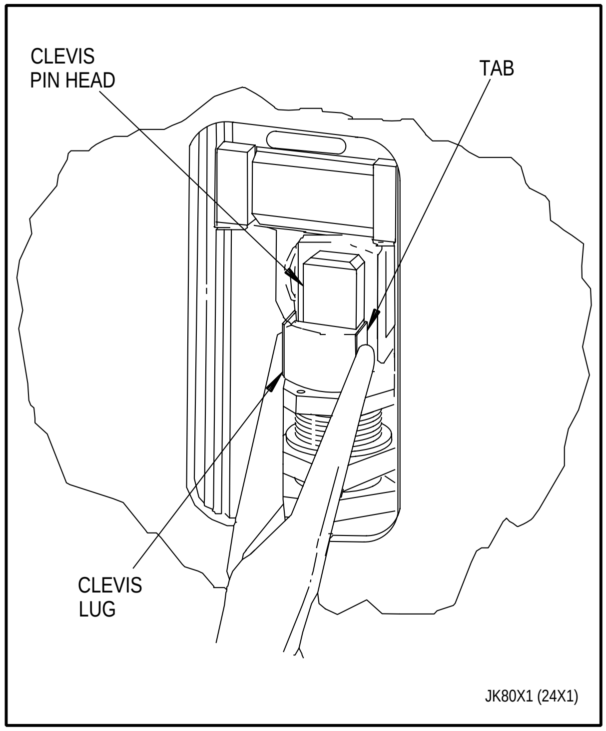


Figure 2. Augmentor Convergent Nozzle Area Sizing - Securing Key Washer

WORK PACKAGE

TECHNICAL PROCEDURES

AUGMENTOR CONVERGENT AND DIVERGENT NOZZLE -

FUNCTIONAL CHECK

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

REFERENCE MATERIAL REQUIRED

Title	Number
Engine Accessories and Rigging Procedures - - - - - - - - - -	T.O. 2J-F100-53-4
Shafts, Flexible, Primary and Secondary Actuator,Convergent Nozzle - - - - - - - - - - - - - - - - - - -	WP 047 00
Actuators, Ball Screw, Primary and Secondary,Convergent Nozzle -	WP 048 00
Engine -	T.O. 2J-F100-53-5
Augmentor Duct and Nozzle Module - Installation withModule Supported on Maintenance Stand - - - - - - - - - -	WP 226 00
Augmentor Duct and Nozzle Module - Transfer fromPWA 22563 Stand and Installation -	WP 227 00
Augmentor Duct and Nozzle Module - - - - - - - - - - - - - - - - - -	T.O. 2J-F100-53-10
Augmentor Duct and Nozzle Module - Assembly - - - - - - - - -	WP 701 00
Augmentor Convergent Nozzle Area Sizing - - - - - - - - - - - -	WP 702 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, ANTIGALLING (PWA 36035)	FEL-PRO C-300

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
KEY WASHER	4025416	5

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	AUGMENTOR CONVERGENT AND DIVERGENT NOZZLE - FUNCTIONAL CHECK	
	TORQUE ADAPTER, PRIMARY CONVERGENT NOZZLE BALLSCREW ACTUATOR, TURN AND COUNT - - - - - - - - - - - - - - - - - -	PWA 51757 OR
	ADAPTER, AUGMENTOR NOZZLE ACTUATOR DRIVE - - - - - - - -	PWA 56639

ILLUSTRATED SUPPORT EQUIPMENT

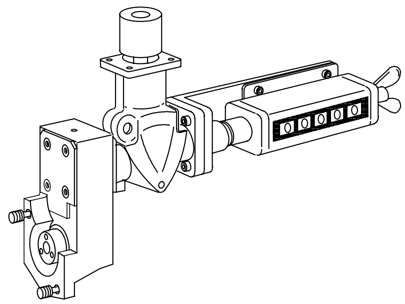


Figure T1. PWA 51757 TORQUE ADAPTER

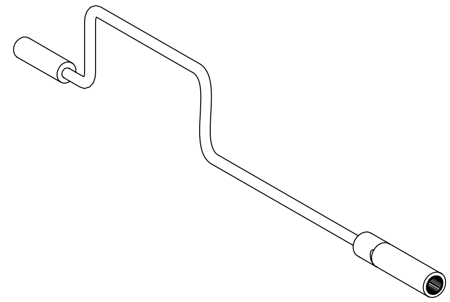


Figure T2. PWA 56639 ADAPTER

1. INTRODUCTION.

a. This work package contains instructions for performing a functional check on augmentor convergent and divergent nozzle when augmentor duct and nozzle module has been partially reworked, stored, or replaced.

b. This check shall be performed before module is installed on engine.

2. AUGMENTOR CONVERGENT AND DIVERGENT NOZZLE - FUNCTIONAL CHECK.

(See Figures 1 and 2.)

NOTE

This check shall be performed on all augmentors which have been reassembled following repair or replacement of parts, or when proper functioning of either convergent or divergent nozzle is questionable.

a. Perform functional check of augmentor convergent nozzle actuation system as follows:

(1) Remove screws(1, figure 1) and five covers(2).

(2) Install PWA 51757 torque adapter or PWA 56639 adapter into right-hand drive (looking aft) connector of primary ball screw actuator; secure with screws.

(3) Open nozzle until pins(3) appear in access holes of augmentor nozzle support.

(4) Bend tabs of key washers(4) open. Remove key washers and pins (3).

(5) Turn PWA 51757 torque adapter to open nozzle. Visually check all actuators through access openings for actuator rod end movement. Replace defective actuators or flexible shafts. Refer to T.O. 2J-F100-53-4, WP 047 00 or WP 048 00.

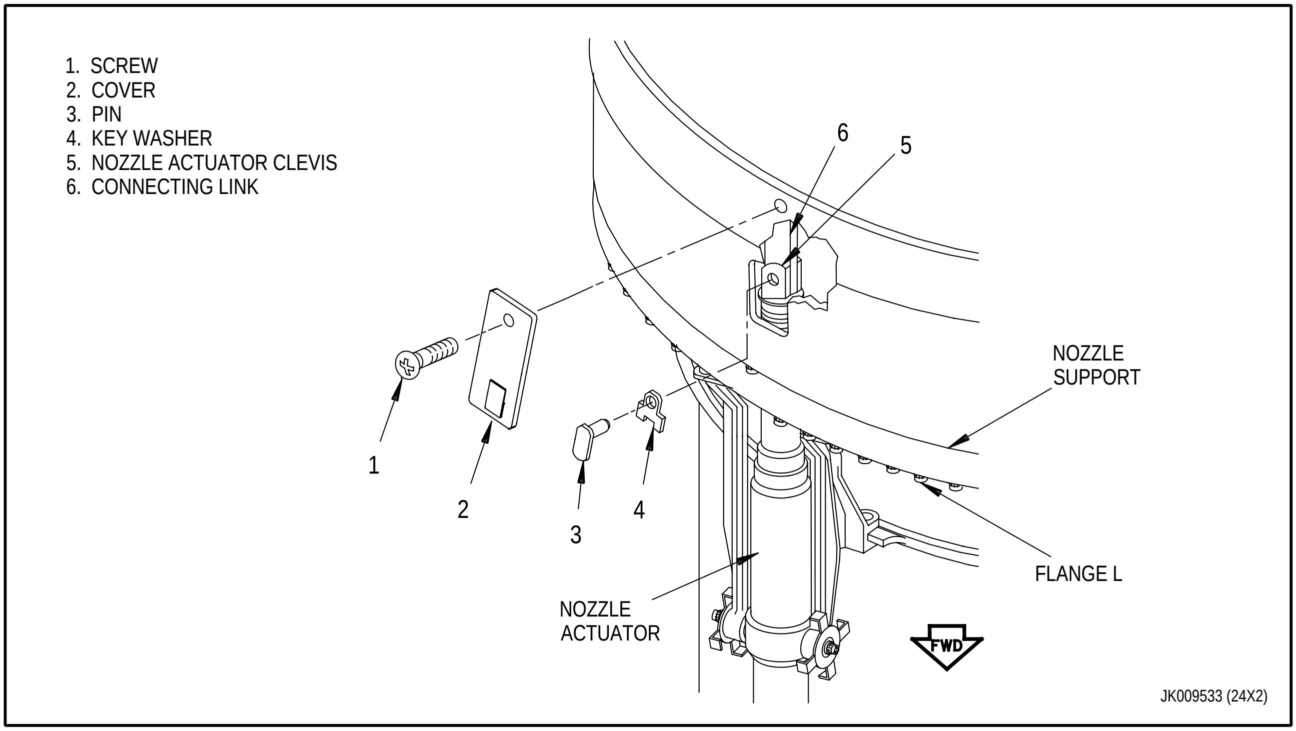


Figure 1. Agumentor Nozzle Actuator Attachment - Removal/Installation

(6) Retract actuators until actuator clevises and synchronizing ring link lugs can be seen in access openings.

CAUTION

- Damage to augmentor mechanism can result from improperly secured actuator clevis pins.
- Do not secure any key washer until freedom of movement and full travel is determined between mating parts. Damage to parts can result if this precaution is not taken.

NOTE

Work one actuator at a time.

(7) Position new key washer between actuator clevis and clevis lug. Align holes of key washer and actuator clevis.

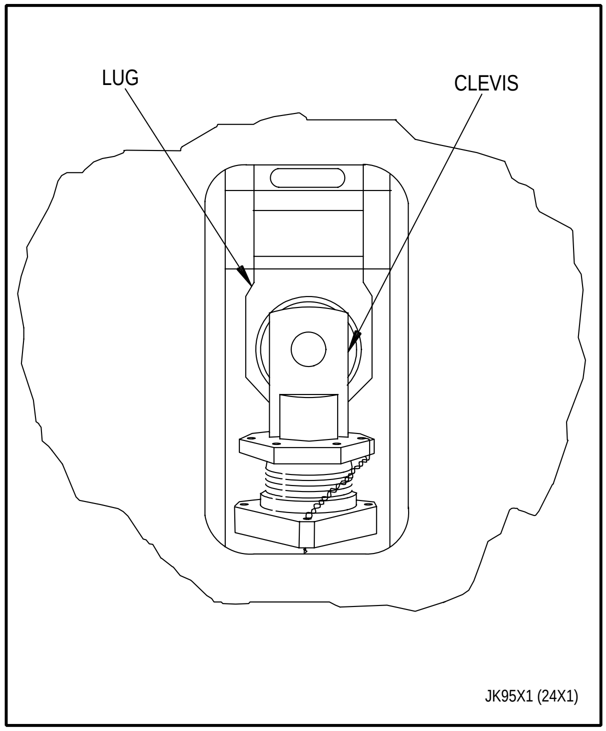


Figure 2. Convergent Nozzle Actuator Clevis Pin - Hole Alignment

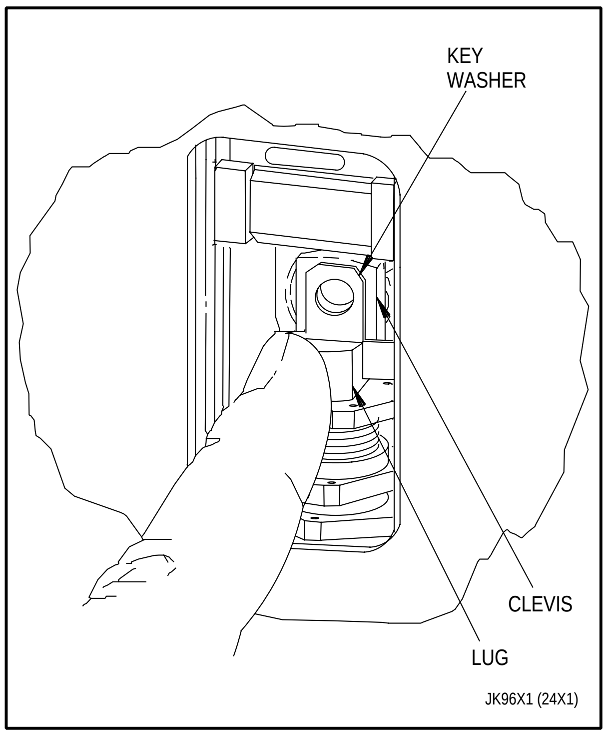


Figure 3. Convergent Nozzle Actuator Clevis Pin - Key Washer Installation

(8) Apply Fel-Pro C-300 antigalling compound to pin. Install pin through holes in key washer, actuator clevis, and synchronizing ring connecting link. Rotate pin to position long end of pin behind clevis lug.

NOTE

- Ensure long end of clevis pin head is behind clevis lug before bending tabs of key washer.
- Maximum gap between key washer and actuator clevis lug shall not exceed 0.020 inch.

(9) Bend tabs of key washer around sides of actuator clevis lug to retain pin.

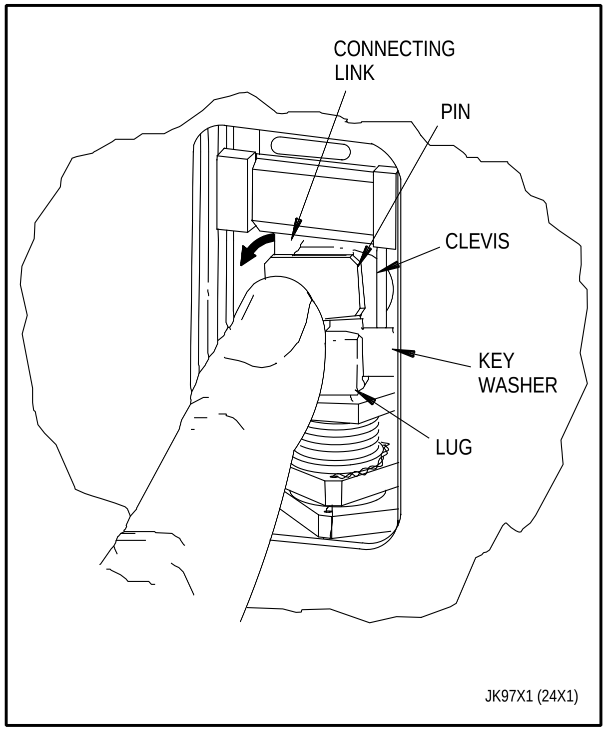


Figure 4. Convergent Nozzle Actuator Clevis - Pin Installation

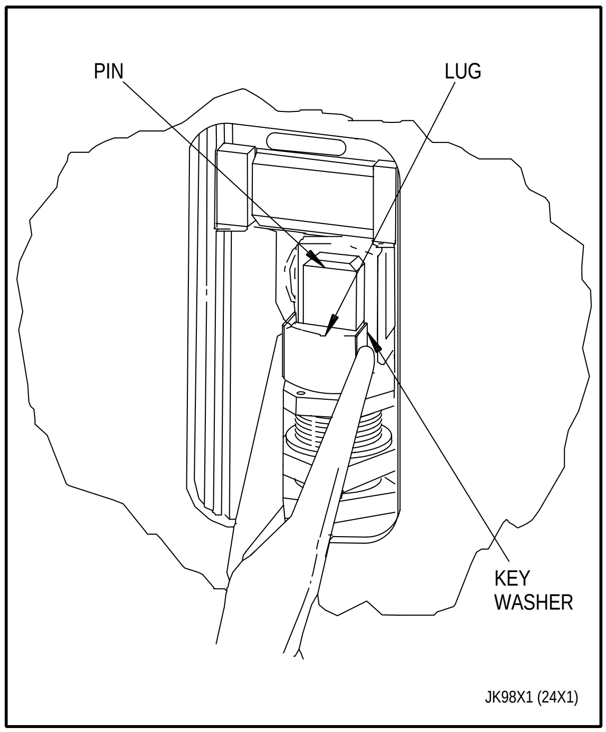


Figure 5. Convergent Nozzle Actuator Clevis - Pin Retention

(10) Turn wrench to hard stop at fully open position. Set wrench counter to zero.

(11) Turn wrench to hard stop at fully closed position. Number of turns from hard stop to hard stop shall be 341 ±1 turn. If number of turns is not 341 ±1 turn, reinstall primary and secondary ball screw actuators. Refer to T.O. 2J-F100-53-10, WP 701 00.

(12) Position covers(2, figure 1) on access openings and secure with screws(1). Torque 23 to 26 pound-inches plus torque required to turn screw through locknut.

NOTE

Convergent nozzle should be in open position for functional check of divergent nozzle.

b. Perform functional check of divergent nozzle system as follows:

WARNING

Be careful not to pinch fingers between seal/segment overlap when cycling divergent nozzle.

NOTE

Divergent nozzle should move from stop without binding; exit diameter should change by about four inches through full travel.

(1) Cycle divergent nozzle from closed to open to closed position by grasping trailing edges of opposite divergent nozzle segments and applying moderate inward and outward force.

(2) If there is binding or restricted movement, check for proper assembly and fit of all parts.

c. Cycle convergent nozzle to closed position. Ensure divergent nozzle is in closed position.

d. Remove all tooling.

3. FOLLOW-ON MAINTENANCE.

a. Perform convergent nozzle area sizing. Refer to T.O. 2J-F100-53-10, WP 702 00, to verify rigging after module has been partially or completely rebuilt when the following components have been removed or replaced:

- convergent nozzle segment
- augmentor nozzle lever
- damaged actuators
- damaged primary or secondary actuator flexible shafts
- any linkage involving synchronizing ring

b. Install augmentor duct and nozzle module on engine. Refer to T.O. 2J-F100-53-5, WP 727 00.

WORK PACKAGE

INTRODUCTION

AUGMENTOR DUCT AND NOZZLE MODULE -

TABLE OF LIMITS AND CLEARANCE CHARTS

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	0				

1. INTRODUCTION

a. This work package introduces 800 00 and up series of work packages for augmentor duct and nozzle module. This series provides table of limits and clearance charts. The following work packages are included in this series:

WP No.	Title
801 00	Augmentor Duct and Nozzle Module F100-PW-229 (F-15) - Table of Limits and Clearance Charts
802 00	Augmentor Duct and Nozzle Module F100-PW-220 (F-16) - Table of Limits and Clearance Charts
803 00 through 899 00	Open

WORK PACKAGE

TECHNICAL PROCEDURES

AUGMENTOR DUCT AND NOZZLE MODULE -

TABLE OF LIMITS AND CLEARANCE CHARTS

EFFECTIVITY: ENGINE MODEL F100-PW-229 (F-15)

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 16

REFERENCE MATERIAL REQUIRED

Title		Number
Standard Maintenance Procedures	- - - - - - - - - - - - - - - - -	T.O. 2-1-111

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains dimensional limits and clearance charts for augmentor duct and nozzle module.

2. GENERAL INSTRUCTIONS.

a. The augmentor duct and nozzle module dimensional limits are contained in three tables: Table 1 consists of fits and clearances between mating parts; table 2 provides instructions for all special torque procedures; table 3 provides spring loads.

b. Each entry has a reference number which corresponds to a similar number on figure 1. The figure is used for part identification and to indicate where in assembly referenced limit applies.

c. Heading DIR indicates frequency and manner of inspection for adjacent reference number. Letters A, B, C, D, E, and F are used to designate inspection requirements as follows:

NOTE

Absence of letter indicates fit is used only for manufacturing purposes, and is not required for assembly.

A Measurements required at depot repair, probably performed at assembly or bench assembly.

B Clearances that are estimated either by trial assembly or similar means. Measurements are required when feel or appearance indicates looseness or tightness which is outside specified tolerance. Measurements shall also be taken if either of parts involved is replaced and parts shall be selected to fit within tolerance specified.

C Estimated clearance checked at assembly. Measure suspected deviations as stated in Category B.

D Measurements required to provide analytical inspection on first three engines reaching each successive time. For example, operator with 300 hours shall perform this inspection on first three engines to reach 600 hours, 900 hours, and so on. Any of inspections which show excessive wear condition shall be changed to Category A.

E Clearances that are not subject to wear or change in normal operation and which shall be estimated during analytic inspection. Suspected change of fit required measurement as in Category B.

F Clearances to be measured only at replacement of parts. Many of these fits will be machine shop measurements.

d. For a more detailed explanation of reference numbers, limits, term, symbols, and units, refer to T.O. 2-1-111.

e. The Minimum and Maximum tolerance in Limits column of Fits and Clearances Tables represent values obtained by subtracting Minimum and Maximum dimensions in Dimensions for Reference column, and adding a wear tolerance where approved.

(1) Limits without a single asterisk (*) or double asterisk (**) appearing in limits column have a Replace If Over tolerance added to either Minimum or Maximum limit, or both.

(2) Limits with a single asterisk (*) appearing in limits column have no Replace If Over tolerance assigned.

(3) Limits with a double asterisk (**) appearing in either Minimum or Maximum limits column, or both have been assigned a Replace If Over clearance limit identical to respective blueprint clearance limit.

3. TERMS AND SYMBOLS.

a. Symbol T in Minimum and Maximum in Table of Limits column indicates tight fit.

b. Unless otherwise specified, all fits are diametrical, except spline fits which are calculated from chordal dimensions.

c. Letter-number codes enclosed within a circle on limits charts, such as A12, are of contractor significance only and shall be ignored.

d. Letter-number codes within parenthesis, such as (C-8), relate to coordinates on outer margins of each clearance chart to facilitate location.

e. Symbol ∂ is resultant of accumulative dimensioning.

4. UNITS.

a. Figures in Minimum and Maximum columns in Tables of Limits shall be interpreted as follows: Torque in pound-inches, spring pressure in pounds, and all other limits in inches.

Table 1. Fits and Clearances
(See FO-1.)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4551	Divergent Nozzle Segment Pin -	.3110	.3120		
	Segment - - - - - - - - - - - - - - -	.3125	.3175	.0005	.027*
4553	Divergent Nozzle Segment Pin -	.311	.312		
	Connecting Link - - - - - - - - - - -	.313*	.321*	.001*	.044*
4554	Side Clearance Divergent Nozzle				
	Segment Connecting Link - - -	.440*	.460*		
	Segment and Tab Washer - - - - -	.468*	.484*	.008	.114*
4555	Divergent Nozzle Segment Pin -	.125	.127		
	Segment - - - - - - - - - - - - - - -	.129	.136	.002*	.011*
4556	Divergent Nozzle Segment Pin -	.125	.127		
	Seal Connecting Link - - - - - -	.135	.149	.008*	.024*
4557	Side Clearance Divergent Nozzle				
	Segment Seal Connecting Link	.260	.280		
	Segment - - - - - - - - - - - - - - -	.282	.294	.002*	.034*
4558	Convergent Nozzle Segment Hinge				
	Pin - - - - - - - - - - - - - - - - -	.188*	.189*		
	Divergent Nozzle Segment - - - -	.190	.195	.001*	.023*
4559	Convergent Nozzle Segment Hinge				
	Pin - - - - - - - - - - - - - - - - -	.188*	.189*		
	Segment - - - - - - - - - - - - - - -	.190	.195*	.001*	.017*
4564	Divergent Nozzle Segment				
	Connecting Link Pin - - - - - -	.290	.292		
	Connecting Link - - - - - - - - - - -	.293	.299*	.001	.042*
4568	Divergent Nozzle Segment				
	Connecting Link Pin - - - - - -	.290	.292		
	Connecting Link Bracket - - - -	.294	.302	.002	.054*
4572	Roller Bearing Cam Follower - -	.749	.750		
	Augmentor Nozzle Support - - - -	.760	.770	.010	.061*

Table 1. Fits and Clearances (continued)
(See FO-1.)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4573	Roller Bearing Cam Follower - -	.437	.438		
	Augmentor Nozzle Sync Ring - -	.439	.441	.001*	.004*
4574	Convergent Nozzle Segment				
	Bearing - - - - - - - - - - - - - -	.720	.723		
	Segment - - - - - - - - - - - - - - -	.721	.723	.002T	.005L*
4575	Augmentor Nozzle Support Pin -	.311*	.312*		
	Support - - - - - - - - - - - - - - -	.313*	.314*	.001*	.003*
4576	Convergent Nozzle Segment Pin	.6205	.6215		
	Augmentor Nozzle Support - - - -	.622	.626	.0005*	.0055*
4577	Augmentor Nozzle Lever Bolt - -	.309	.311		
	Lever - - - - - - - - - - - - - - - -	.313	.315	.002*	.006*
4578	Augmentor Nozzle Lever Bolt - -	.3090	.3110		
	Connecting Link - - - - - - - - - -	.3120	.3125	.0010*	.0035*
4579	Side Clearance Augmentor Nozzle				
	Connecting Link - - - - - - - -	.374	.376		
	Lever - - - - - - - - - - - - - - - -	.376	.386	.000*	.012*
4580	Augmentor Nozzle Lever Bolt - -	.2470	.2490		
	Connecting Link - - - - - - - - - -	.2495	.2500	.0005*	.0030*
4581	Augmentor Nozzle Lever Bolt - -	.247	.249		
	Lever - - - - - - - - - - - - - - - -	.250	.252	.001	.007*
4582	Side Clearance Augmentor Nozzle				
	Connecting Link - - - - - - - -	.398	.400		
	Lever - - - - - - - - - - - - - - - -	.400	.410	.000	.032*
4583	Convergent Nozzle Segment Pin	.6205	.6215		
	Bearing - - - - - - - - - - - - - - -	.626	.627	.0045	.009*

Table 1. Fits and Clearances (continued)
(See FO-1.)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4585	Augmentor Nozzle Support Pin -	.311	.312		
	Support - - - - - - - - - - - - - - -	.313	.314	.001*	.003*
4587	Side Clearance Convergent Nozzle Segment Seal Hinge -	.158∂	.166∂		
	Divergent Nozzle Segment Seal Hinge - - - - - - - - - - - - - - -	.167∂	.175∂	.001	.029*
4588	Divergent Nozzle Segment Seal Pin - - - - - - - - - - - - - - - - -	.1230	.1245		
	Seal Hinge - - - - - - - - - - - - -	.1260	.1280	.0015	.009*
4589	Divergent Nozzle Segment Seal Pin - - - - - - - - - - - - - - - - -	.1230	.1245		
	Convergent Nozzle Segment Seal Hinge - - - - - - - - - - - - - - -	.1250	.1265	.0005	.009*
4590	Divergent Nozzle Segment Seal Pin - - - - - - - - - - - - - - - - -	.1230	.1245		
	Seal Washer - - - - - - - - - - - -	.1260	.1280	.0015*	.0050*
4591	Side Clearance Convergent Nozzle Segment Seal Hinge -	.160	.164		
	Divergent Nozzle Segment Seal Hinge - - - - - - - - - - - - - - -	.167	.171	.003	.025*
4592	Balance Nozzle Segment Seal Pin - - - - - - - - - - - - - - - - -	.093	.095		
	Convergent Nozzle Segment Seal Hinge - - - - - - - - - - - - - - -	.096	.098	.001	.017*
4593	Balance Nozzle Segment Seal Pin - - - - - - - - - - - - - - - - -	.093	.095		
	Seal Hinge - - - - - - - - - - - - -	.095	.099	.000	.017*
4594	Side Clearance Augmentor Nozzle Support Guide - - - - - - - - -	.100	.110		
	Support - - - - - - - - - - - - - - -	.111	.115	.001	.030*
4595	Side Clearance Augmentor Nozzle Support Guide - - - - - - - - -	2.529	2.539		
	Support - - - - - - - - - - - - - - -	2.540	2.550	.001*	.021*

Table 1. Fits and Clearances (continued)
(See FO-1.)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4596	Augmentor Nozzle Sync Ring				
	Connecting Link Pin	.248	.249		
	Connecting Link	.250	.252	.001*	.004*
4597	Augmentor Nozzle Sync Ring				
	Connecting Link Pin	.2480	.2490		
	Runner	.2495	.2505	.0005*	.0025*
4598	Augmentor Nozzle Support Guide	.245	.255		
	Sync Ring Runner	.260	.270	.005	.040*
4599	Side Clearance Augmentor Nozzle				
	Sync Ring Connecting Link	.380	.390		
	Sync Ring	.395	.403	.005*	.023*
4601	Augmentor Nozzle Sync Ring				
	Shoulder Bolt	.309	.311		
	Sync Ring	.312	.314	.001	.011*
4602	Augmentor Nozzle Sync Ring				
	Shoulder Bolt	.3090	.3110		
	Connecting Link	.3120	.3125	.0010*	.0035*
4603	Side Clearance Augmentor Nozzle				
	Connecting Link	.374	.376		
	Sync Ring	.377	.385	.001	.021*
4604	Augmentor Nozzle Sync Ring				
	Shoulder Bolt	.309	.310		
	Sync Ring	.310	.312	.0005	.011*
4605	Augmentor Nozzle Sync Ring				
	Shoulder Bolt	.3090	.3100		
	Connecting Link	.3105	.3115	.0005*	.0025*
4606	Side Clearance Augmentor Nozzle				
	Sync Ring	.749∂	.777∂		
	Sync Ring Shoulder Bolt	.782	.792	.005*	.043*
4607	Augmentor Nozzle Actuator Pin	.2480	.2490		
	Actuator	.2495	.2500	.0005*	.0020*

Table 1. Fits and Clearances (continued)
(See FO-1.)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4608	Augmentor Nozzle Actuator Pin	.2480	.2490		
	Connecting Link Bearing - - - -	.2495	.2500	.0005*	.0020*
4609	Side Clearance Augmentor Nozzle				
	Connecting Link Bearing - - -	.338	.343		
	Actuator - - - - - - - - - - - - - -	.345	.350	.002*	.012*
4611	Augmentor Nozzle Actuator - - -	.4990	.4995		
	Actuator Support Bearing - - - -	.4995	.5000	.0000*	.0010*
4612	Augmentor Nozzle Actuator				
	Support Bearing - - - - - - - -	.9057	.9062		
	Support - - - - - - - - - - - - - - -	.9056	.9061	.0006T*	.0004*
4613	Side Clearance Augmentor Nozzle				
	Flexible Shaft - - - - - - - - -	.2420	.2485		
	Actuator - - - - - - - - - - - - - -	.2490	.2510	.0005*	.0090*
4614	Augmentor Nozzle Actuator - - -	1.109	1.115		
	Flexible Shaft - - - - - - - - - -	1.125	1.127	.010*	.018*
4615	Augmentor Nozzle Actuator - - -	1.386	1.391		
	Helical Compression Spring				
	Seat - - - - - - - - - - - - - - - -	1.392	1.393	.001*	.007*
4616	Convergent Nozzle Segment Pin	.248	.249		
	Segment - - - - - - - - - - - - - - -	.250	.252	.001*	.004*
4617	Convergent Nozzle Segment Pin	.2480	.2490		
	Augmentor Nozzle Connecting				
	Link - - - - - - - - - - - - - - - -	.2495	.2505*	.0005*	.0025*
4618	Side Clearance Augmentor Nozzle				
	Connecting Link - - - - - - - -	.341	.343		
	Convergent Nozzle Segment - - -	.343*	.349*	.000*	.008*
4622	Augmentor Nozzle Actuator				
	Support Bolt - - - - - - - - - -	.244	.246		
	Augmentor Combustion Chamber				
	Duct - - - - - - - - - - - - - - - -	.247	.249	.001*	.005*

Table 1. Fits and Clearances (continued)
(See FO-1.)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4623	Augmentor Nozzle Actuator Support Bolt - - - - - - - - - -	.244	.246		
	Augmentor Combustion Chamber Duct - - - - - - - - - - - - - - - -	.252	.254	.006*	.010*
4624	Augmentor Nozzle Actuator Support Bolt - - - - - - - - - -	.244	.246		
	Support - - - - - - - - - - - - - - -	.252	.254	.006*	.010*
4625	Augmentor Nozzle Actuator Support Bolt - - - - - - - - - -	.244	.246		
	Support - - - - - - - - - - - - - - -	.247	.248	.001*	.004*
4663	Convergent Nozzle Segment Hinge Pin - - - - - - - - - - - - - - - -	.187	.189		
	Segment - - - - - - - - - - - - - - -	.190	.194	.001	.018*
4664	Convergent Nozzle Segment Hinge Pin - - - - - - - - - - - - - - - -	.187	.189		
	Balance Nozzle Segment - - - - -	.190	.194	.001	.023*
4665	Augmentor Nozzle Support Bolt	.21875	.21925		
	Support - - - - - - - - - - - - - - -	.22000	.22200	.00075*	.00325*
4668	Side Clearance Divergent Nozzle Segment Hinge - - - - - - - - - -	.619	.629		
	Convergent Nozzle Segment Hinge - - - - - - - - - - - - - - -	.614	.618	.001*	.035*
4669	Side Clearance Balance Nozzle Segment Hinge - - - - - - - - - -	1.1020	1.1080		
	Convergent Nozzle Segment Hinge - - - - - - - - - - - - - - -	1.109	1.113	.001*	.021*
4671	Augmentor Nozzle Actuator - - -	1.122	1.124		
	Flexible Shaft - - - - - - - - - -	1.125	1.127	.001*	.005*
4672	Balance Nozzle Segment Shoulder Bolt - - - - - - - - - - - - - - - -	.4965	.4985		
	Connecting Link Bearing - - - -	.4995	.5000	.0010*	.0035*

Table 1. Fits and Clearances (continued)
(See FO-1.)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4673	Balance Nozzle Segment				
	Shoulder Bolt - - - - - - -	.4965	.4985		
	Segment - - - - - - - - - - - -	.4995	.506*	.0010*	.0095*
4674	Balance Nozzle Segment				
	Connecting Link Bearing	.8228	.8232		
	Connecting Link - - - - - - -	.8237	.8258	.0005*	.0074*
4675	Side Clearance (Free State)				
	Balance Nozzle Segment				
	Connecting Link Bearing	.4496	.4500		
	Segment - - - - - - - - - - - -	.4510	.4570	.0010*	.0074*
4676	Side Clearance Balance				
	Nozzle Segment Segment				
	Shoulder Bolt - - - - - - -			.000*	.068*
4681	Convergent Nozzle Segment				
	Guide - - - - - - - - - - - -	.5890	.5902		
	Segment - - - - - - - - - - - -	.5906	.5918	.0004*	.0028*
4682	Divergent Nozzle Segment				
	Connecting Link Bracket				
	Connecting Link Pin				
	Retainer - - - - - - - - - -			.000*	.020*
4683	Side Clearance Divergent				
	Nozzle Segment Connecting				
	Link - - - - - - - - - - - - -	.370	.390		
	Connecting Link Bracket -	.395∂	.425∂	.005	.065*
4686	Augmentor Nozzle Lever				
	Bearing - - - - - - - - - - -	1.2594	1.2598		
	Lever - - - - - - - - - - - - -	1.2603	1.2614	.0005*	.0020*
4687	Convergent Nozzle Segment				
	Guide - - - - - - - - - - - -	.5890	.5902		
	Augmentor Nozzle Lever				
	Bearing - - - - - - - - - - -	.5907	.5910	.0005*	.0020*

Table 1. Fits and Clearances (continued)
(See FO-1.)

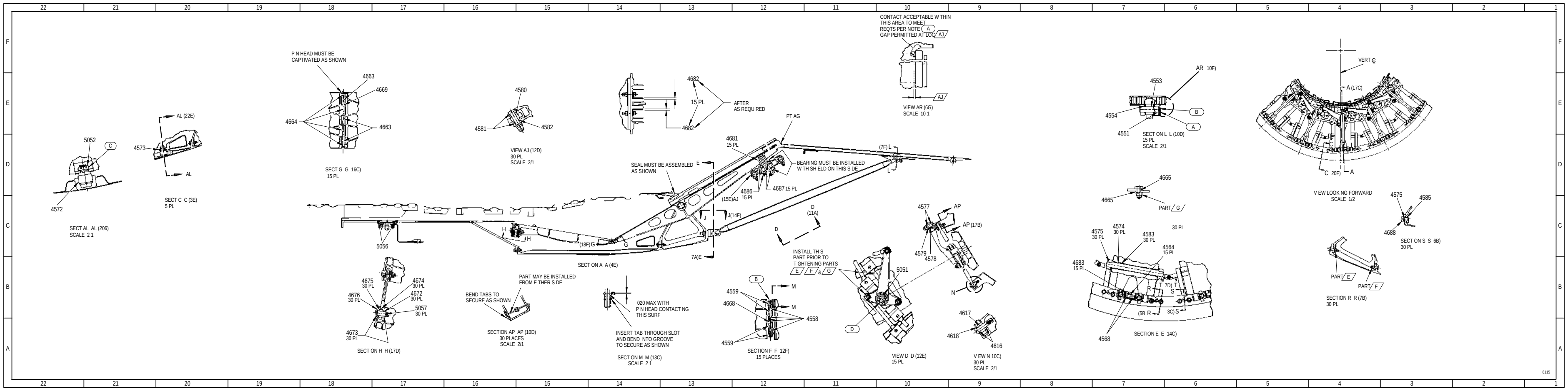
Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4688	Divergent Nozzle Segment Connecting Link Bracket	.1890	.1895		
	Support Pin - - - - - - - - - -	.1875	.1880	.001*	.002*

Table 2. Torque Limits
(See FO-1.)

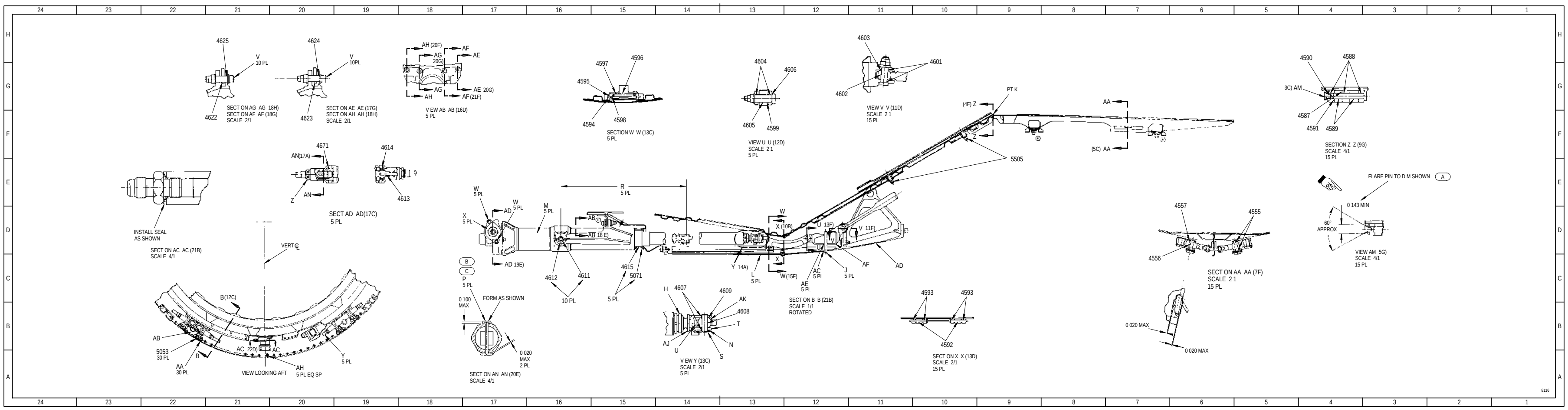
Ref No.	Name	Limits Min	Limits Max
5051	Augmentor Nozzle Lever Bearing Retaining Nut **NOTE** Tighten nut 20 to 30 lb-in. Loosen to 0 lb-in. and then tighten 5 to 10 lb-in. and advance to next tablock position. Do not exceed this position.		
5052	Augmentor Nozzle Roller Bearing Cam Follower Nut **NOTE** Tighten nut 45 to 55 lb-in. If necessary, advance maximum of 30 degrees to install cotterpin. Do not exceed 90 lb-in.		
5053	Augmentor Nozzle Actuator Support Bolt - - - - - - - -	43	48
5055	Torque Nut 15 to 18 lb-in.		
5056	Drain Valve Mounting Screw - - - - - - - - - - - - - - - -	8	12
5057	Torque nut 140 to 160 lb-in. Ensure threads protrude through nut.		

Table 3. Spring Loads
(See FO-1.)

Ref No.	Name	Limits Min	Limits Max
5071	Helical Compression Spring at 1.760 in. - - - - - - - -	1.875	2.375
	at 0.890 in. -	8.438	9.438



FO-1. Augmentor Duct and Nozzle Module - Dimensional Limits and Torque Values (Sheet 1 of 2)



FO-1. Augmentor Duct and Nozzle Module - Dimensional Limits and Torque Values (Sheet 2 of 2)

WORK PACKAGE

TECHNICAL PROCEDURES

AUGMENTOR DUCT AND NOZZLE MODULE -

TABLE OF LIMITS AND CLEARANCE CHARTS

EFFECTIVITY: ENGINE MODEL F100-PW-229 (F-16)

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 18

REFERENCE MATERIAL REQUIRED

Title		Number
Standard Maintenance Procedures	- - - - - - - - - - - - - - - - -	T.O. 2-1-111

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

a. This work package contains dimensional limits and clearance charts for augmentor duct and nozzle module.

2. GENERAL INSTRUCTIONS.
(See FO-1 and Tables 1 through 3.)

a. The augmentor duct and nozzle module dimensional limits are contained in three tables: Table 1 consists of fits and clearances between mating parts; table 2 provides instructions for all special torque procedures; table 3 provides spring loads.

b. Each entry has a reference number which corresponds to a similar number on figure 1. The figure is used for part identification and to indicate where in assembly referenced limit applies.

c. Heading DIR indicates frequency and manner of inspection for adjacent reference number. Letters A, B, C, D, E, and F are used to designate inspection requirements as follows:

NOTE

Absence of letter indicates fit is used only for manufacturing purposes, and is not required for assembly.

A Measurements required at depot repair, probably performed at assembly or bench assembly.

B Clearances that are estimated either by trial assembly or similar means. Measurements are required when feel or appearance indicates looseness or tightness which is outside specified tolerance. Measurements shall also be taken if either of parts involved is replaced and parts shall be selected to fit within tolerance specified.

C Estimated clearance checked at assembly. Measure suspected deviations as stated in Category B.

D Measurements required to provide analytical inspection on first three engines reaching each successive time. For example, operator with 300 hours shall perform this inspection on first three engines to reach 600 hours, 900 hours, and so on. Any of inspections which show excessive wear condition shall be changed to Category A.

E Clearances that are not subject to wear or change in normal operation and which shall be estimated during analytic inspection. Suspected change of fit required measurement as in Category B.

F Clearances to be measured only at replacement of parts. Many of these fits will be machine shop measurements.

d. For a more detailed explanation of reference numbers, limits, term, symbols, and units, refer to T.O. 2-1-111.

e. The Minimum and Maximum tolerance in Limits column of Fits and Clearances Tables represent values obtained by subtracting Minimum and Maximum dimensions in Dimensions for Reference column, and adding a wear tolerance where approved.

(1) Limits without a single asterisk (*) or double asterisk (**) appearing in limits column have a Replace If Over tolerance added to either Minimum or Maximum limit, or both.

(2) Limits with a single asterisk (*) appearing in limits column have no Replace If Over tolerance assigned.

(3) Limits with a double asterisk (**) appearing in either Minimum or Maximum limits column, or both have been assigned a Replace If Over clearance limit identical to respective blueprint clearance limit.

3. TERMS AND SYMBOLS.

a. Symbol T in Minimum and Maximum in Table of Limits column indicates tight fit.

b. Unless otherwise specified, all fits are diametrical, except spline fits which are calculated from chordal dimensions.

c. Letter-number codes enclosed within a circle on limits charts, such as A12, are of contractor significance only and shall be ignored.

d. Letter-number codes within parenthesis, such as (C-8), relate to coordinates on outer margins of each clearance chart to facilitate location.

e. Symbol is resultant of accumulative dimensioning.

4. UNITS.

a. Figures in Minimum and Maximum columns in Tables of Limits shall be interpreted as follows: Torque in pound-inches, spring pressure in pounds, and all other limits in inches.

Table 1. Fits and Clearances (See FO-1.)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4551	Divergent Nozzle Segment Pin -	.3110	.3120		
	Segment - - - - - - - - - - - - - - -	.3125	.3175	.0005*	.0270*
4553	Divergent Nozzle Segment Pin -	.311	.312		
	Connecting Link - - - - - - - - - -	.313*	.321*	.001*	.044*
4554	Side Clearance Divergent Nozzle				
	Segment Connecting Link - - -	.440*	.460*		
	Segment and Tab Washer - - - - -	.468*	.484*	.008	.114*
4555	Divergent Nozzle Segment Pin -	.125	.127		
	Segment - - - - - - - - - - - - - - -	.129	.136	.002*	.011*
4556	Divergent Nozzle Segment Pin -	.125	.127		
	Seal Connecting Link - - - - - -	.135	.149	.008*	.024*
4557	Side Clearance Divergent Nozzle				
	Segment Seal Connecting Link	.260	.280		
	Segment - - - - - - - - - - - - - - -	.282	.294	.002*	.034*
4558	Convergent Nozzle Segment Hinge				
	Pin - - - - - - - - - - - - - - - -	.188*	.189*		
	Divergent Nozzle Segment - - - -	.190	.195	.001*	.023*
4559	Convergent Nozzle Segment Hinge				
	Pin - - - - - - - - - - - - - - - -	.188*	.189*		
	Segment - - - - - - - - - - - - - - -	.190	.195*	.001*	.017*
4560	External Nozzle Segment Rod End				
	Bearing Segment - - - - - - - -	.4365*	.4415*		
	Segment - - - - - - - - - - - - - - -	.442*	.449*	.0005*	.0125*
4561	Side Clearance External Nozzle				
	Segment Rod End Bearing - - -	.342*	.344*		
	Divergent Nozzle Segment				
	Connecting Link Bracket - - -	.344	.350*	.000*	.048*
4562	External Nozzle Segment Rod End				
	Bearing Bolt - - - - - - - - - -	.2488	.2493		
	Rod End Bearing - - - - - - - - - -	.2490*	.2510*	.0003T*	.0022*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4563	External Nozzle Segment Rod End Bearing Bolt - - - - -	.2488	.2493		
	Divergent Nozzle Segment Connecting Link Bracket	.2495	.2505	.0002	.0262*
4564	Divergent Nozzle Segment Connecting Link Pin - - -	.290	.292		
	Connecting Link - - - - - - -	.293	.299	.001*	.042*
4568	Divergent Nozzle Segment Connecting Link Pin - - -	.290	.292		
	Connecting Link Bracket - -	.294	.302	.002	.054*
4572	Roller Bearing Cam Follower - - - - - - - - - -	.749	.750		
	Augmentor Nozzle Support -	.760	.770	.010	.061*
4573	Roller Bearing Cam Follower - - - - - - - - - -	.437	.438		
	Augmentor Nozzle Sync Ring	.439	.441	.001*	.004*
4574	Convergent Nozzle Segment Bearing - - - - - - - - - - - -	.720*	.723*		
	Segment - - - - - - - - - - - -	.721*	.723	.002T*	.003*
4575	Augmentor Nozzle Support Pin - - - - - - - - - - - - - - -	.311*	.312*		
	Support - - - - - - - - - - - -	.313*	.314*	.001*	.003*
4576	Convergent Nozzle Segment Pin - - - - - - - - - - - - - - -	.6244	.6250		
	Augmentor Nozzle Support -	.6252	.6258	.0002*	.0014*
4577	Augmentor Nozzle Lever Bolt - - - - - - - - - - - - - -	.309	.311		
	Lever - - - - - - - - - - - - - - -	.313	.315	.002*	.006*
4578	Augmentor Nozzle Lever Bolt - - - - - - - - - - - - - -	.3090	.3110		
	Connecting Link - - - - - - -	.3120	.3125	.0010*	.0035*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
4579	Side Clearance Augmentor Nozzle				
	Connecting Link - - - - - - - -	.374	.376		
	Lever - - - - - - - - - - - - - - - -	.376	.386	.000*	.012*
4580	Augmentor Nozzle Lever Bolt - -	.2470	.2490		
	Connecting Link - - - - - - - - - -	.2495	.2500	.0005*	.0030*
4581	Augmentor Nozzle Lever Bolt - -	.247	.249		
	Lever - - - - - - - - - - - - - - - -	.250	.252	.001	.007*
4582	Side Clearance Augmentor Nozzle				
	Connecting Link - - - - - - - -	.398	.400		
	Lever - - - - - - - - - - - - - - - -	.400	.410	.000	.032*
4583	Convergent Nozzle Segment Pin	.6205*	.6215*		
	Bearing - - - - - - - - - - - - - - -	.6260	.6270	.0045*	.009*
4585	Augmentor Nozzle Support Pin -	.311*	.312*		
	Support - - - - - - - - - - - - - - -	.313*	.314*	.001*	.003*
4587	Side Clearance Convergent				
	Nozzle Segment Seal Hinge - -	.158∂	.166∂		
	Divergent Nozzle Segment Seal				
	Hinge - - - - - - - - - - - - - - -	.167∂	.175∂	.001	.029*
4588	Divergent Nozzle Segment Seal				
	Pin - - - - - - - - - - - - - - - -	.1230	.1245		
	Seal Hinge - - - - - - - - - - - - -	.1260	.1280	.0015	.009*
4589	Divergent Nozzle Segment Seal				
	Pin - - - - - - - - - - - - - - - -	.1230	.1245		
	Convergent Nozzle Segment Seal				
	Hinge - - - - - - - - - - - - - - -	.1250	.1265	.0005	.009*
4590	Divergent Nozzle Segment Seal				
	Pin - - - - - - - - - - - - - - - -	.1230	.1245		
	Seal Washer - - - - - - - - - - - -	.1260	.1280	.0015*	.0050*
4591	Side Clearance Convergent				
	Nozzle Segment Seal Hinge - -	.160	.164		
	Divergent Nozzle Segment Seal				
	Hinge - - - - - - - - - - - - - - -	.167	.171	.003	.025*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4592	Balance Nozzle Segment Seal Pin - - - - - - - - - - - - - - - -	.093	.095		
	Convergent Nozzle Segment Seal Hinge - - - - - - - - - - - - - - -	.096	.098	.001	.017*
4593	Balance Nozzle Segment Seal Pin - - - - - - - - - - - - - - - -	.093	.095		
	Seal Hinge - - - - - - - - - - - - -	.095	.099	.000	.017*
4594	Side Clearance Augmentor Nozzle Support Guide - - - - - - - - - -	.100	.110		
	Support - - - - - - - - - - - - - - -	.111	.115	.001	.030*
4595	Side Clearance Augmentor Nozzle Support Guide - - - - - - - - - -	2.529	2.539		
	Support - - - - - - - - - - - - - - -	2.540	2.550	.001*	.021*
4596	Augmentor Nozzle Sync Ring Connecting Link Pin - - - - - -	.248	.249		
	Connecting Link - - - - - - - - - -	.250	.252	.001*	.004*
4597	Augmentor Nozzle Sync Ring Connecting Link Pin - - - - - -	.2480	.2490		
	Runner - - - - - - - - - - - - - - - -	.2495	.2505	.0005*	.0025*
4598	Augmentor Nozzle Support Guide	.245	.255		
	Sync Ring Runner - - - - - - - - -	.260	.270	.005	.040*
4599	Side Clearance Augmentor Nozzle Sync Ring Connecting Link - -	.380	.390		
	Sync Ring - - - - - - - - - - - - - -	.395	.403	.005*	.023*
4601	Augmentor Nozzle Sync Ring Shoulder Bolt - - - - - - - - - -	.309	.311		
	Sync Ring - - - - - - - - - - - - - -	.312	.314	.001	.011*
4602	Augmentor Nozzle Sync Ring Shoulder Bolt - - - - - - - - - -	.3090	.3110		
	Connecting Link - - - - - - - - - -	.3120	.3125	.0010*	.0035*
4603	Side Clearance Augmentor Nozzle Connecting Link - - - - - - - -	.374	.376		
	Sync Ring - - - - - - - - - - - - - -	.377	.385	.001	.021*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4604	Augmentor Nozzle Sync Ring				
	Shoulder Bolt - - - - - - - - - -	.309	.310		
	Sync Ring - - - - - - - - - - - - - -	.312*	.314*	.002	.005*
4605	Augmentor Nozzle Sync Ring				
	Shoulder Bolt - - - - - - - - - -	.3090	.3100		
	Connecting Link - - - - - - - - - -	.3105	.3115	.0005*	.0025*
4606	Side Clearance Augmentor Nozzle				
	Sync Ring - - - - - - - - - - - -	.749∂	.777∂		
	Sync Ring Shoulder Bolt - - - -	.782	.792	.005*	.043*
4607	Augmentor Nozzle Actuator Pin	.2480	.2490		
	Actuator - - - - - - - - - - - - - -	.2495	.2500	.0005*	.0020*
4608	Augmentor Nozzle Actuator Pin	.2480	.2490		
	Connecting Link Bearing - - - -	.2495	.2500	.0005*	.0020*
4609	Side Clearance Augmentor Nozzle				
	Connecting Link Bearing - - -	.338	.343		
	Actuator - - - - - - - - - - - - - -	.345	.350	.002*	.012*
4611	Augmentor Nozzle Actuator - - -	.4990	.4995		
	Actuator Support Bearing - - - -	.4995	.5000	.0000*	.0010*
4612	Augmentor Nozzle Actuator				
	Support Bearing - - - - - - - -	.9057	.9062		
	Support - - - - - - - - - - - - - - -	.9056	.9061	.0006T*	.0004*
4613	Side Clearance Augmentor Nozzle				
	Flexible Shaft - - - - - - - - -	.2420	.2485		
	Actuator - - - - - - - - - - - - - -	.2490	.2510	.0005*	.0090*
4614	Augmentor Nozzle Actuator - - -	1.109	1.115		
	Flexible Shaft - - - - - - - - - -	1.125	1.127	.010*	.018*
4615	Augmentor Nozzle Actuator - - -	1.386	1.391		
	Helical Compression Spring				
	Seat - - - - - - - - - - - - - - - -	1.392	1.393	.001*	.007*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4616	Convergent Nozzle Segment Pin	.248	.249		
	Segment - - - - - - - - - - - - - - -	.250	.252	.001*	.004*
4617	Convergent Nozzle Segment Pin	.2480	.2490		
	Augmentor Nozzle Connecting Link - - - - - - - - - - - - - - - -	.2495	.2505*	.0005*	.0025*
4618	Side Clearance Augmentor Nozzle Connecting Link - - - - - - - -	.341	.343		
	Convergent Nozzle Segment - - -	.343*	.349*	.000*	.008*
4622	Augmentor Nozzle Actuator Support Bolt - - - - - - - - - -	.244	.246		
	Augmentor Combustion Chamber Duct - - - - - - - - - - - - - - - -	.247	.249	.001*	.005*
4623	Augmentor Nozzle Actuator Support Bolt - - - - - - - - - -	.244	.246		
	Augmentor Combustion Chamber Duct - - - - - - - - - - - - - - - -	.252	.254	.006*	.010*
4624	Augmentor Nozzle Actuator Support Bolt - - - - - - - - - -	.244	.246		
	Support - - - - - - - - - - - - - - -	.252	.254	.006*	.010*
4625	Augmentor Nozzle Actuator Support Bolt - - - - - - - - - -	.244	.246		
	Support - - - - - - - - - - - - - - -	.247	.248	.001*	.004*
4663	Convergent Nozzle Segment Hinge Pin - - - - - - - - - - - - - - - -	.187	.189		
	Segment - - - - - - - - - - - - - - -	.190	.194	.001*	.018*
4664	Convergent Nozzle Segment Hinge Pin - - - - - - - - - - - - - - - -	.187	.189		
	Balance Nozzle Segment - - - - -	.190	.194	.001*	.023*
4665	Augmentor Nozzle Support Bolt	.21875	.21925		
	Support - - - - - - - - - - - - - - -	.22000	.22200	.00075*	.00325*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref Min	Dimensions for Ref Max	Limits Min	Limits Max
4668	Side Clearance Divergent Nozzle Segment Hinge - - - - - - - - -	.619	.629		
	Convergent Nozzle Segment Hinge - - - - - - - - - - - - - - - -	.612*	.620*	.000*	.037*
4669	Side Clearance Balance Nozzle Segment Hinge - - - - - - - - -	1.100*	1.110*		
	Convergent Nozzle Segment Hinge - - - - - - - - - - - - - - - -	1.106*	1.116*	.000*	.024*
4671	Augmentor Nozzle Actuator - - -	1.122	1.124		
	Flexible Shaft - - - - - - - - - - -	1.125	1.127	.001*	.005*
4672	Balance Nozzle Segment Shoulder Bolt - - - - - - - - - - - - - - - -	.4965	.4985		
	Connecting Link Bearing - - - -	.4995	.5000	.0010*	.0035*
4673	Balance Nozzle Segment Shoulder Bolt - - - - - - - - - - - - - - - -	.4965	.4985		
	Segment - - - - - - - - - - - - - - - -	.4995	.5060*	.0010*	.0095*
4674	Balance Nozzle Segment Connecting Link Bearing - - -	.8228	.8232		
	Connecting Link - - - - - - - - - -	.8237	.8258	.0005*	.0074*
4675	Side Clearance (Free State) Balance Nozzle Segment Connecting Link Bearing - - -	.4496	.4500		
	Segment - - - - - - - - - - - - - - - -	.4510	.4570	.0010*	.0074*
4676	Side Clearance Balance Nozzle Segment				
	Segment Shoulder Bolt - - - - -			.000*	.068*
4677	External Nozzle Segment Hinge Pin - - - - - - - - - - - - - - - - -	.248	.249		
	Hinge - - - - - - - - - - - - - - - - -	.250	.254	.001*	.006*

Table 1. Fits and Clearances (See FO-1.) (continued)

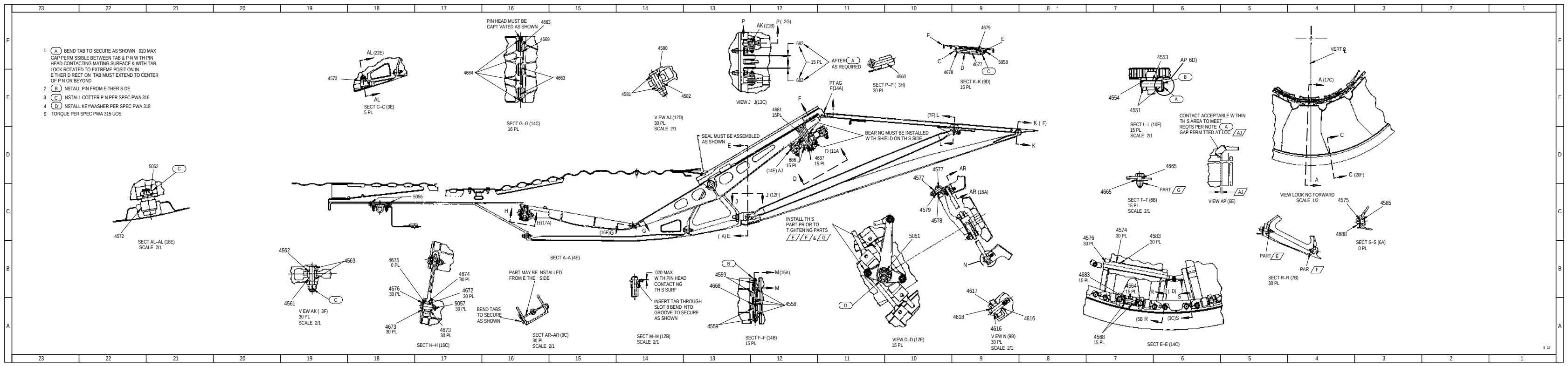
Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
4678	External Nozzle Segment Hinge Pin - - - - - - - - - - - - - - - - - -	.248*	.249*		
	Divergent Nozzle Segment - - - -	.250	.252	.001*	.004*
4679	External Nozzle Segment Hinge Pin - - - - - - - - - - - - - - - - - -	.189*	.190*		
	Divergent Nozzle Segment - - - -	.208*	.210*	.018*	.021*
4681	Convergent Nozzle Segment Guide - - - - - - - - - - - - - - - -	.5890	.5902		
	Segment - - - - - - - - - - - - - - - -	.5906	.5918	.0004*	.0028*
4682	Divergent Nozzle Segment Connecting Link Bracket Connecting Link Pin Retainer			.000*	.020*
4683	Side Clearance Divergent Nozzle Segment Connecting Link - - -	.370	.390		
	Connecting Link Bracket - - - - -	.395∂	.425∂	.005	.065*
4686	Augmentor Nozzle Lever Bearing	1.2594	1.2598		
	Lever - - - - - - - - - - - - - - - - - -	1.2603	1.2614	.0005*	.0020*
4687	Convergent Nozzle Segment Guide - - - - - - - - - - - - - - - -	.5890	.5902		
	Augmentor Nozzle Lever Bearing	.5907	.5910	.0005*	.0020*

Table 2. Torque Limits
(See FO-1.)

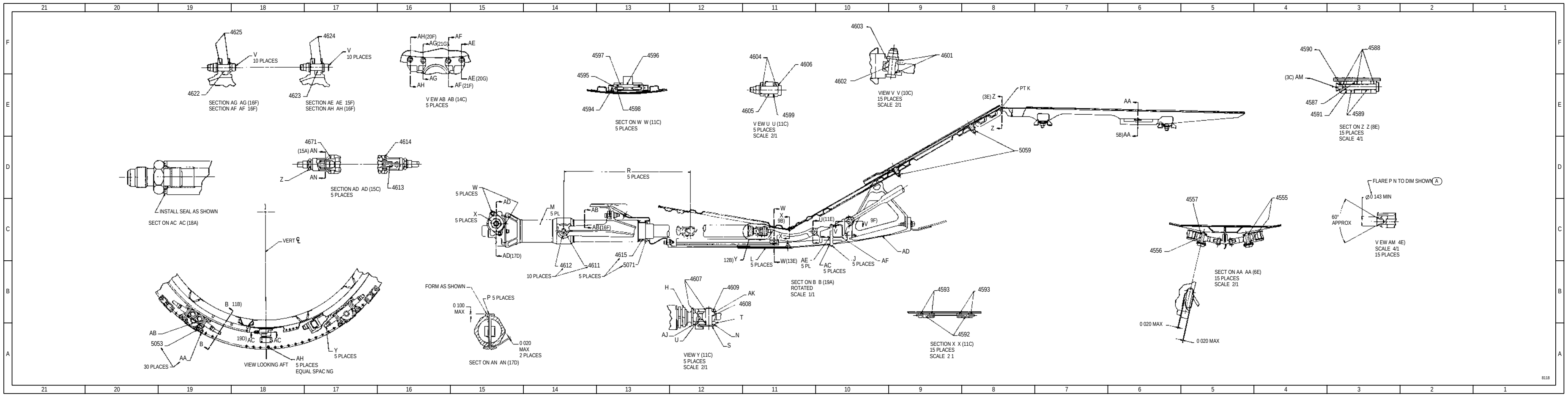
Ref No.	Name	Limits Min	Limits Max
5051	Augmentor Nozzle Lever Bearing Retaining Nut **NOTE** Tighten nut 20 to 30 lb-in. Loosen to 0 lb-in. and then tighten 5 to 10 lb-in. and advance to next tablock position. Do not exceed this position.		
5052	Augmentor Nozzle Roller Bearing Cam Follower Nut **NOTE** Tighten nut 45 to 55 lb-in. If necessary, advance maximum of 30 degrees to install cotterpin. Do not exceed 90 lb-in.		
5053	Augmentor Nozzle Actuator Support Bolt	43	48
5055	Torque Nut 15 to 18 lb-in.		
5056	Drain Valve Mounting Screw	8	12
5057	Torque nut 140 to 160 lb-in. Ensure threads protrude through nut.		

Table 3. Spring Loads
(See FO-1.)

Ref No.	Name	Limits Min	Limits Max
5071	Helical Compression Spring at 1.760 in. - - - - - -	1.875	2.375
	at 0.890 in. -	8.438	9.438



FO-1.   Augmentor Duct and Nozzle Module - Dimensional Limits and Torque Values (Sheet 1 of 2)



FO-1. Augmentor Duct and Nozzle Module - Dimensional Limits and Torque Values (Sheet 2 of 2)